

DAIHATSU

G202

MA

CB-Engine

MAINTENANCE

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NO. 9188

MAINTENANCE REQUIREMENTS

The scheduled maintenance service is important to ensure trouble-free, safe and economical driving. Failure to perform the scheduled maintenance may cause an accident or serious damage.

If you conduct the periodical maintenance, Daihatsu car owners may reduce the chance of accidents or car problems. Furthermore, it becomes possible for you to find at an earlier stage malfunctions which may lead to serious damages. Consequently, potential vehicle damage can be prevented or the degree of the damage can be minimized.

Therefore, all of the persons who are concerned with servicing the Daihatsu vehicles should offer the periodical maintenance service to Daihatsu car owners in order that they may be protected from accidents or unexpected problems.

To prevent malfunctions in advance, however, conducting the periodical maintenance service only is insufficient. It is essential that owners themselves perform maintenance, such as the pre-starting check described in the owner's manual, so that the vehicle exhibits no abnormal change or phenomenon. Hence, please explain to owners about the necessity of maintenance performed by them.

However, malfunction may occur on those vehicles which are always checked by their owners. For instance, if a part instructed to be replaced periodically should be used beyond the replacement intervals and the life of the part has expired, there are cases where malfunction occurs suddenly despite the fact that no malfunction has taken place until yesterday. To prevent such malfunction in advance, be sure to replace parts recommended to be replaced periodically at the specified replacement intervals.

This section describes those items of the scheduled maintenance service recommended by the Daihatsu and their intervals. Be sure to observe the check schedule.

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MAINTENANCE SCHEDULE

NOTE:

1. Perform the periodic maintenance when the odometer reading or duration from last periodic maintenance whichever comes first, if not specified.
2. Continue to perform the periodic maintenance after 100,000 km (60,000 miles) by same interval with before 100,000 km.

○ ... Check or inspect ● ... Change or replace

Section	Items	What to check	Interval												See page	
			x 1,000 km	1	10	20	30	40	50	60	70	80	90	100		
			x 1,000 miles	0.6	6	12	18	24	30	36	42	48	54	60		
			Years	-	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5		
Engine	Engine proper	• Condition of engine starting and abnormal noise				○		○		○		○		○		
		• Idling and acceleration	○		○		○		○		○		○		○	
		• Exhaust gas			○		○		○		○		○		○	
	Air cleaner element	• Cleaning		○	○	○	○	○	○	○	○	○	○	○	○	
		• Replacement	Every 40,000 km (24,000 miles)													
	Valve clearance	• Clearance					○						○			
	Engine oil	• Level	○	○	○	○	○	○	○	○	○	○	○	○	○	
		• Leakage	○		○		○		○		○		○		○	
		• Change		●	●	●	●	●	●	●	●	●	●	●	●	
	Oil filter	• Replacement	Every 10,000 km (6,000 miles)													
	Fuel line & connection	• Damage • Leakage • Crack • Tightness	○		○		○		○		○		○		○	
		• Fuel hoses replacement	Every 4 years													
	Fuel filter	• Replacement	Every 60,000 km (36,000 miles)													
	Carburetor	Linkage • Operation					○						○			
		Throttle valve • Operation					○						○			
Choke valve • Operation						○						○				
Coolant	• Level	○	○	○	○	○	○	○	○	○	○	○	○	○		
	• Leakage	○		○		○		○		○		○		○		
	• Change	Every 2 years														
Radiator cap	• Function					○						○				
Drive belt	• Tension • Crack • Damage	○	○	○	○	○	○	○	○	○	○	○	○	○		
Timing belt	• Replacement	Every 100,000 km (60,000 miles)														

○ ... Check or inspect ● ... Change or replace

Section	Items	What to check	× 1,000 km	1	10	20	30	40	50	60	70	80	90	100	See page	
			× 1,000 miles	0.6	6	12	18	24	30	36	42	48	54	60		
			Years	-	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5		
Exhaust emission control system	Brow-by gas recirculation device	<ul style="list-style-type: none"> • Connection • Damage 						○				○				
	Fuel evaporative emission control device	Piping	<ul style="list-style-type: none"> • Damage 						○				○			
		Charcoal canister	<ul style="list-style-type: none"> • Clogging • Damage 						○				○			
		Check valve	<ul style="list-style-type: none"> • Function 						○				○			Refer to the chassis section of the service manual
	Emission control device	<ul style="list-style-type: none"> • Tightness • Damage 				○		○		○		○		○		
	Dash pot or throttle positioner	<ul style="list-style-type: none"> • Operation 				○		○		○		○		○		
	Piping	<ul style="list-style-type: none"> • Damage • Attaching condition 				○		○		○		○		○		
	Heat preventive device	<ul style="list-style-type: none"> • Tightness • Damage 				○		○		○		○		○		
	Secondary air feeding device	<ul style="list-style-type: none"> • Function 				○		○		○		○		○		
Air suction filter element	<ul style="list-style-type: none"> • Replace 		Every 40,000 km (24,000 miles)													
Engine electrical system	Battery	<ul style="list-style-type: none"> • Electrolyte level 		○	○	○	○	○	○	○	○	○	○	○		
		<ul style="list-style-type: none"> • Specific gravity • Connection of terminal section 			○		○		○		○		○			
	Ignition timing	Spark plug	<ul style="list-style-type: none"> • Condition 			○		○		○		○		○		
		Ignition system	<ul style="list-style-type: none"> • Timing 			○		○		○		○		○		
		Distributor cap and rotor	<ul style="list-style-type: none"> • Condition 			○		○		○		○		○		
Ignition timing	Timing advance Device			○		○		○		○		○				

NOTE:
 • If the vehicle should be operated under severe driving conditions, vehicle operated occasionally or vehicle operated dusty area, more frequent maintenance are required.

G2MA00003-00000

COLD ENGINE OPERATION

1. Inspection of engine coolant level

Check to see if coolant level is between the LOW and FULL lines of the reserve tank.

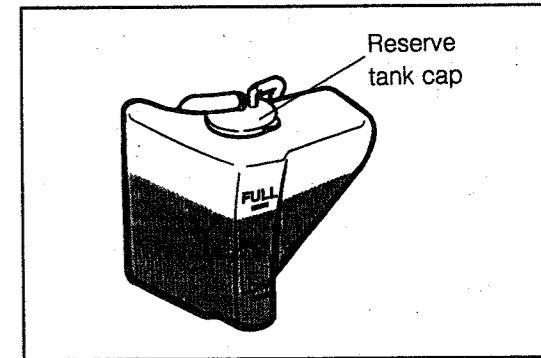
If coolant level is near the LOW level or below the LOW level, add the coolant up to the full level.

WARNING:

- Never open the radiator cap when the engine is still hot.
- Failure to observe this caution will cause you to get scalded.

NOTE:

- If no coolant is present in the reserve tank or the coolant level is very low, check for water leakage, using a radiator cap tester.
- Here, the coolant refers to the coolant having an adequate freezing protection rating.



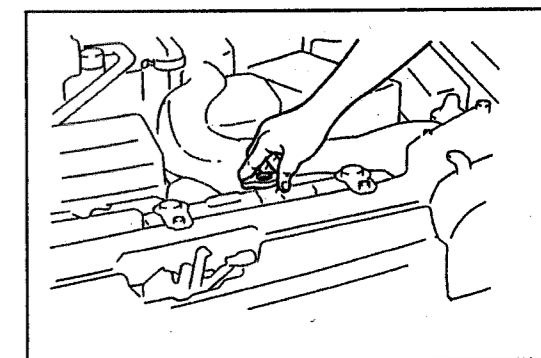
G2MA00004-99999

2. Inspection of radiator cap and radiator filling port

WARNING:

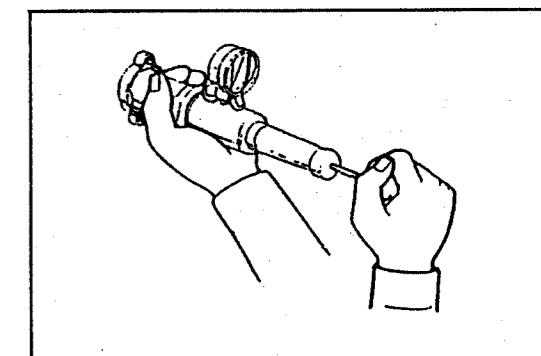
- Never open the radiator cap when the engine is still hot.
- Failure to observe this caution will cause you to get scalded.

- (1) Ensure that the engine coolant temperature is nearly atmosphere temperature.
- (2) Turn the radiator cap to opening direction (counterclockwise) for one step (until the first detention will be feels).
- (3) Lightly depress the radiator cap one to two times to release the inner pressure of radiator.
- (4) Open the radiator cap by turn it to counterclockwise while depressing the radiator cap.
- (5) Remove the radiator cap.



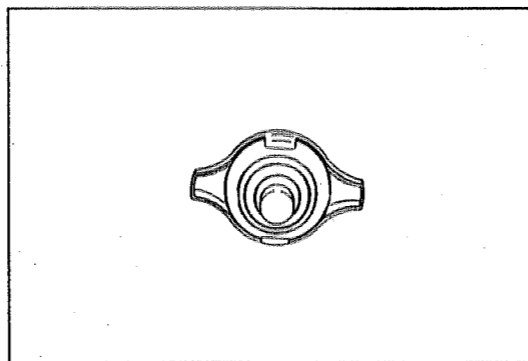
G2MA00005-99999

- (6) Install the radiator cap to the radiator cap tester.
- (7) Check the radiator cap by means of a radiator cap tester to see if the relief valve opens at a pressure of 58.84 - 102.97 kPa (0.6 - 1.05 kgf/cm², 8.53 - 14.9 psi). If the radiator cap fails to confirm to the specification, replace the radiator cap.
- (8) Remove the radiator cap from the radiator cap tester.



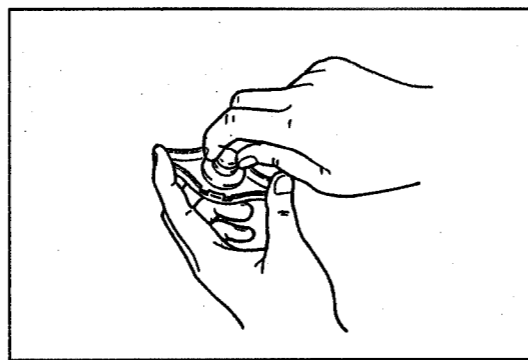
G2MA00006-99999

- (9) Check the seal packing of the radiator cap for damage. Replace the radiator cap with a new one, if any damage is exists.



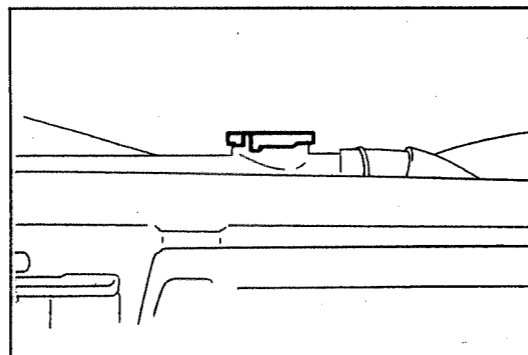
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- (10) Lift the valve at the vacuum side with your fingers. Ensure that the valve is functioning properly. Replace the radiator cap with a new one, if the valve fails to function.



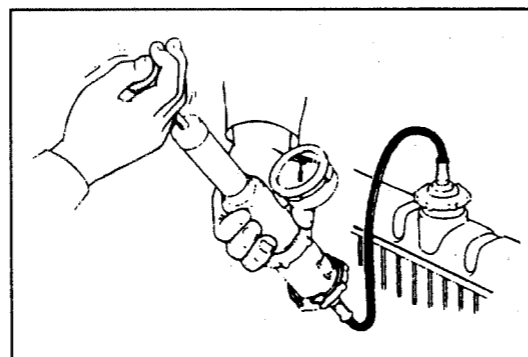
G2MA00008-99999

- (11) Check the radiator filling port
- ① Ensure that the upper part of the radiator filling port has no crack, distortion or dented.
 - ② Ensure that the radiator cap locked section of the radiator filling port has no crack, distortion or dented. Replace the radiator, if any crack, distortion or dent are existing.



G2MA00009-99999

- (12) Install the radiator cap to the radiator securely.



G2MA00010-99999

3. Inspection of engine coolant leakage

WARNING:

- Never open the radiator cap or drain plug when the coolant is still hot. Failure to observe this caution will cause you to get scalded.

- (1) Ensure that the engine coolant temperature is nearly atmosphere temperature.
- (2) Turn the radiator cap to opening direction (counterclockwise) for one step (until the first detention will be feels).
- (3) Lightly depress the radiator cap one to two times to release the inner pressure of the radiator.
- (4) Open the radiator cap by turn it to counterclockwise while depressing the radiator cap.
- (5) Remove the radiator cap.
- (6) Fill the radiator with coolant, if necessary.

- (7) Attach a radiator cap tester.
- (8) Apply a pressure of 117 kPa (1.2 kgf/cm², 17 psi) to the cooling system by means of a radiator cap tester. If the pressure drops, check the hoses, radiator, water pump and heater for evidence of leakage. If no external leakage is found, check the heater core, cylinder block, cylinder head, oil cooler and throttle body for evidence of leakage. Check the hoses for deterioration, cracks, bulge or damage. Replace the damaged part (s) if necessary.
- (9) Remove the radiator cap tester from the radiator.
- (10) Secure the radiator cap to the radiator.

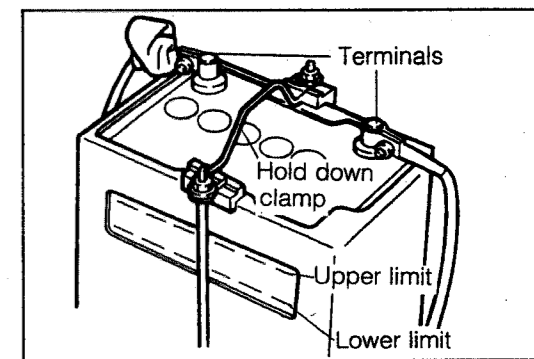
G2MA00011-00000

4. Inspection of the battery

WARNING:

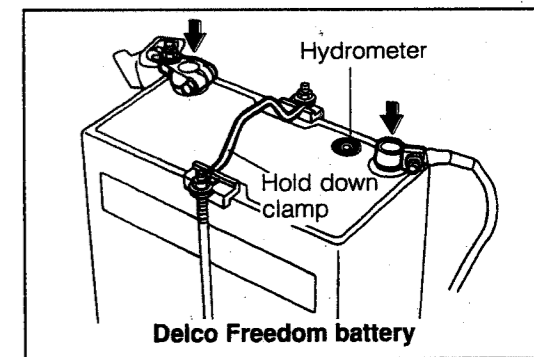
- Never touch at the battery terminals immediately after the engine is stopped.
- Be certain to turn OFF the ignition key switch during the inspection.

- (1) Check the battery terminal case for proper installing condition and cracks. If battery case exhibits improper installing condition or cracks, replace or repair the battery, as required.



G2MA00012-99999

- (2) Check to see if the battery terminals exhibit corrosion and loose connection. If the battery terminal exhibit corrosion and loose condition, disconnect the battery cable terminal which connected to the battery terminals. Remove the any rust, using a wire brush or a fine abrasive paper. After the battery cable terminals have been connected, coat these terminal with a thin film of lithium grease.



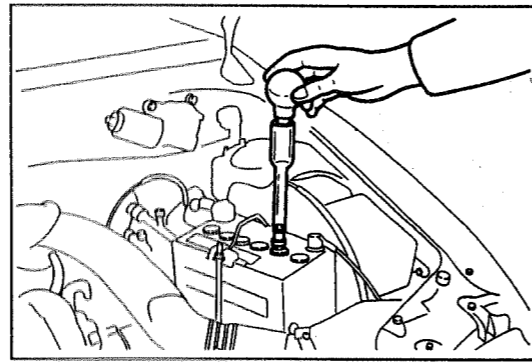
G2MA00013-99999

CAUTION:

- After the battery terminals have been cleaned, make sure that no rust particle remains on the terminals.
- Do not shorten the terminals of the battery with tools of metal objects. If the battery terminals are shorted, it will cause the battery to overheat and can cause damage or explosion.

- (3) Check of specific gravity of battery electrolyte (Except Delco Freedom Battery)
 Measure the specific gravity of the electrolyte of each cell, using a hydrometer. Ensure that the specific gravity is within the specified value.

Standard Specific Gravity: 1.25 or more
 When fully charged at 20°C (68°F)



G2MA00014-99999

If the specific gravity is not within the specified value, check the electrolyte level and replenish distilled water. Then, charge the battery until the specific gravity reaches the specified value.

<Reference>

$$\text{Specific gravity at standard temperature} = \text{Measured specific gravity} + 0.0007 \times (\text{Electrolyte temperature at time of measurement } ^\circ\text{C} - 20)$$

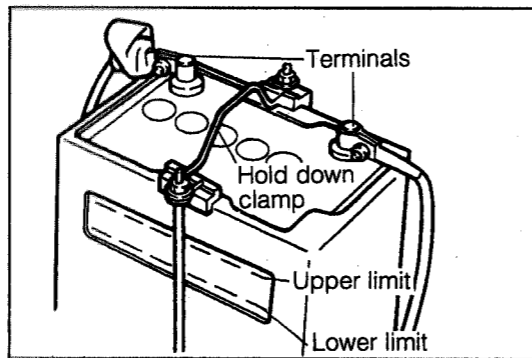
CAUTION:

- Utmost care must be exercised as to the handling of electrolyte. Be careful not to allow the electrolyte to touch to your skin, clothes or any parts of the vehicle.

G2MA00015-00000

- (4) Inspection of battery electrolyte level (Except Delco Freedom Battery)
 Ensure that the battery electrolyte level is in the upper limit level.

If the battery electrolyte level of any cell is not at the upper limit level, replenish distilled water to the upper limit level.



G2MA00016-99999

WARNING:

- Tighten the battery vent caps securely after adding distilled water. Otherwise the battery electrolyte may be splashed out and damage your vehicle or even cause serious bodily injury.
- Battery contains sulfuric acid which is poisonous and corrosive. Therefore, be careful not to splash battery fluid on yourself or clothes and wash the part immediately if it happen. Furthermore, wear protective safety glasses to protect the eyes.
- If you have swallowed battery fluid, drink as much water or milk as possible and immediately see a doctor.
- Keep fire away from the battery. It could cause battery explosion.
- Keep children away from the battery.

CAUTION:

- Wash splashed battery fluid away from paint finish immediately.

NOTE:

- Never add city tap water or sulfuric acid, etc. instead of distilled water.
- If the electrolyte level of each battery cell differs greatly, it is advisable to inspect to see if any electrolyte leakage is present.

- (5) Check battery specific gravity and electrolyte level. (For Delco Freedom Battery)
 Check battery specific gravity and electrolyte level by the color of the hydrometer.

Green Dot is Visible:

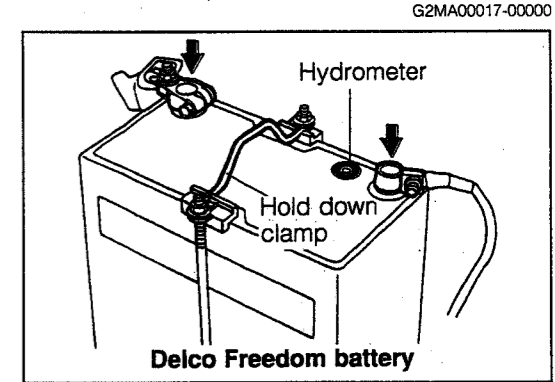
The battery is adequately charged.

Dark (The Green Dot is Invisible.):

The battery must be charged.

Clear of Light Yellow:

Replace the battery.



G2MA00017-00000

G2MA00018-99999

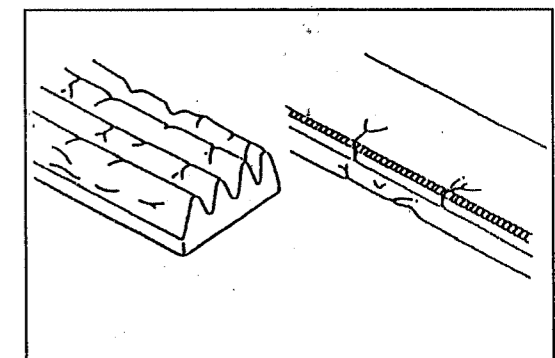
NOTE:

- On the Delco Freedom Battery, it is impossible to add the electrolyte, for it is permanently sealed.
- If the battery is required the charging, be sure to consult with the agent of Delco Freedom Battery for correct charging procedure.

5. Inspection of drive belt

- (1) Visual inspection of the drive belt

Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or ribs or cracks in the inner ridges of the ribs. Replace the drive belt, if necessary.



G2MA00019-99999

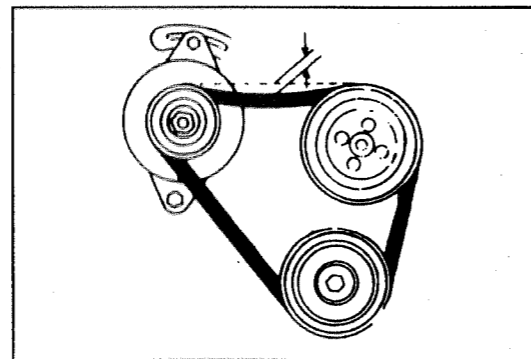
(2) Inspection of the drive belt tension

Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley is pushed with a force of 98 N (10 kgf, 22 lb).

Specified Belt Deflection

New Belt: 5 - 7 mm (0.197 - 0.276 inch)
[with a force of 10 kgf (22 lb) applied at the point shown in the figure.]

Used Belt: 7.5 - 9.5 mm (0.295 - 0.374 inch)
[with a force of 10 kgf (22 lb) applied at the point shown in the figure.]



G2MA00020-99999

If necessary, adjust the drive belt tension.

NOTE:

- "New belt" refers to a belt which has been used on a running engine for less than five minutes.
- "Used belt" refers to a belt which has been used on a running engine for more than five minutes or more.
- After replacing the drive belt, check that it fits properly in the ribbed grooves, especially in the places difficult to see.
- After installing a new belt, run the engine for about five minutes and then recheck the tension.

(3) Adjustment of drive belt tension

- 1 Ensure that the ignition switch turned OFF.
- 2 Slacken the alternator attaching bolts.

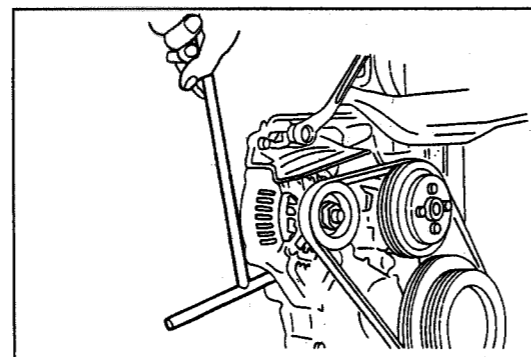
NOTE:

- Slacken the attaching bolts only for alternator moves.

- 3 Apply the specified tension to the alternator drive belt, using a T-shaped wrench or the like.

NOTE:

- As for the specification refer to the step (2).



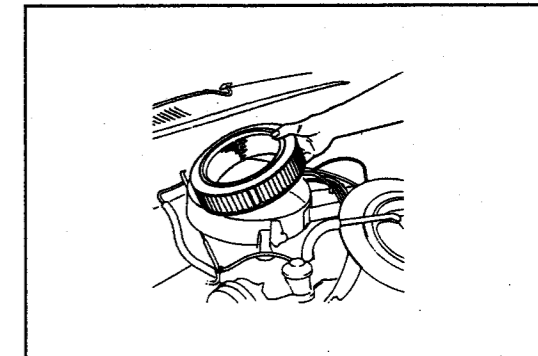
G2MA00021-99999

- 4 Tighten the alternator attaching bolts.

6. Inspection air filter element

(1) Removal of air filter element

- 1 Unlock the clips and remove the wing nut.
- 2 Gradually lift up the air filter case cover.
- 3 Remove the air filter element.



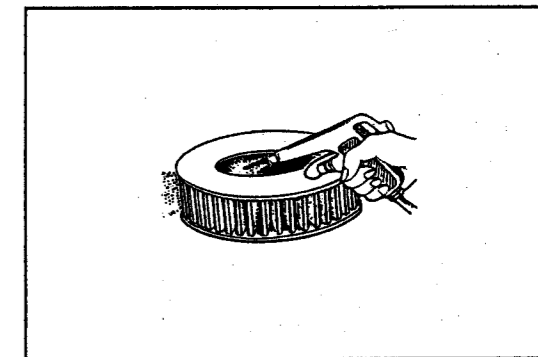
G2MA00022-99999

(2) Cleaning of air filter element

Clean the air filter element with compressed air. First, blow compressed air from the back side of the element thoroughly. Then, blow off the upper side of the element.

CAUTION:

- The air pressure to be used for this cleaning operation should not exceed 392.3 kPa (4.0 kgf/cm², 56.9 psi).
- Protect your eyes with safety goggles during the cleaning operation.



G2MA00023-99999

Replace the air filter element, if necessary.

(3) Installation of the air filter element

- 1 Install the air filter element with align the protrusions sections of air filter case and air filter element.
- 2 Place the air filter case cover.

NOTE:

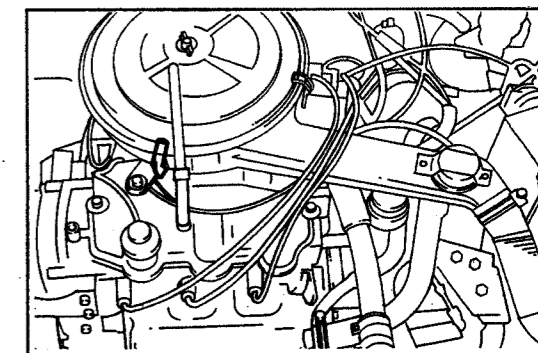
- Ensure that the vacuum hose of the vacuum motor and ITC valve connected properly.
- 3 Align protrusions of the case and cover.
 - 4 Latch the clips and tighten the wing nut.

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7. Inspection of blow-by gas recirculation device

Visually inspect the hoses for improper connections, cracks, leak or damage.

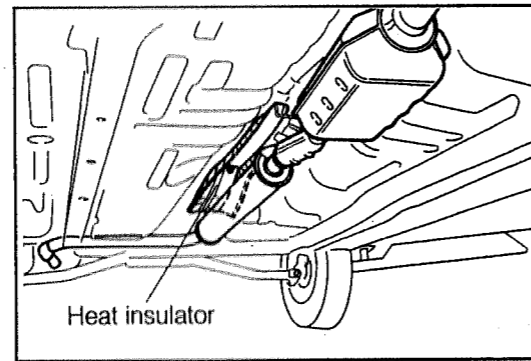
Replace or repair any part which exhibit defects.



G2MA00025-99999

8. Inspection of heat preventive device

- (1) Check the heat insulator for damage.
- (2) Check for adequate clearance between the exhaust manifold and heat insulator.
- (3) Ensure that the attaching bolts are tightened properly.

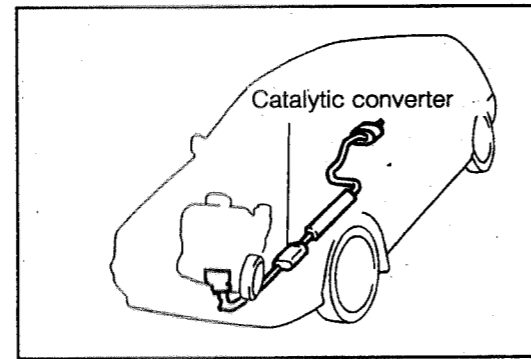


9. Check of exhaust emission control device tightness and damage

- (1) Ensure that the no looseness are existing on attaching bolts.
If looseness is existing retighten the attaching bolts of the catalytic converter.

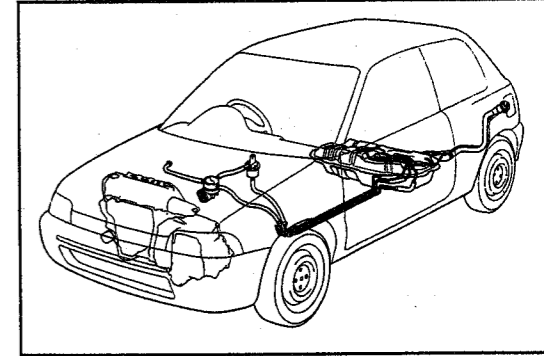
NOTE:

- Be sure to confirm that the no exhaust gas leakage is present at the connecting sections of catalytic converter, after retighten the attaching bolts.
- If gas leakage is present, replace the gasket with new one.
(Refer to the EM section or BO section of service manual.)



10. Inspection of the fuel line and connection

- (1) Visually inspect the fuel line for damage, leakage and crack.
If damage, leakage or crack is existing, repair or replace the part as necessary.
- (2) Ensure that the no looseness are existing on the connected sections of the fuel line.

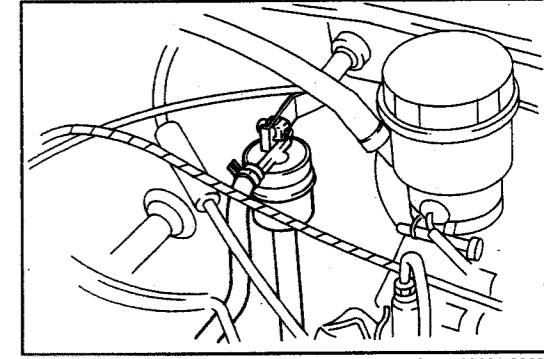


11. Replacement of fuel filter

WARNING:

- Do not work near the open frame.
Failure to observe this caution will cause fire.

- (1) Ensure that the ignition switch turned OFF.
- (2) Open the fuel filler cap.
- (3) Remove the attaching bolt of fuel filter.
- (4) Detach the hose clips from fuel filter side.
- (5) Place the suitable container or cloth under the fuel filter.
- (6) Disconnect the fuel hoses from fuel filter.
- (7) Remove the clips from the fuel hoses.
- (8) Insert the new clips to fuel hoses.
- (9) Install the new fuel filter to the fuel hoses.
- (10) Attach the new clips to the correct position.
- (11) Install the fuel filter by attaching bolt.
- (12) Secure the fuel filler cap.
- (13) Remove the placed container or cloth.



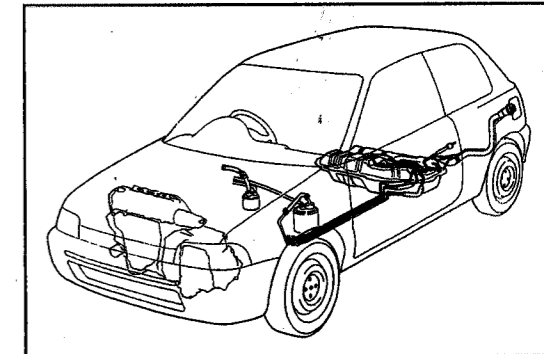
12. Inspection of fuel evaporative emission control device

(Australian specifications)

- (1) Visual inspection of fuel vapor line and connections.
Check the line and connections for loose connections, kinks or damage.
- (2) Visual inspection of fuel tank.
Check the fuel tank for deformation, cracks or fuel leakage.
Replace the fuel tank, if necessary.

NOTE:

- Ensure that the no restriction existing in the hose to the charcoal canister and no malfunction on the fuel filler cap.



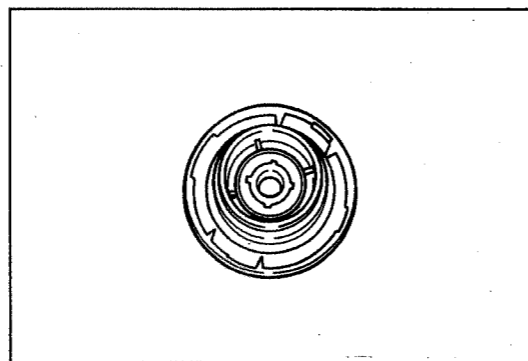
(3) Inspection of the fuel filler cap

Check the fuel filler cap and gasket for damage or deformation.

Also check the safety valve in the fuel filler cap is operating properly. Replace the cap, if necessary.

NOTE:

- If fuel tank deformed by negative pressure, be sure to replace the fuel filler cap with new one after replacing the fuel tank.



G2MA00033-99999

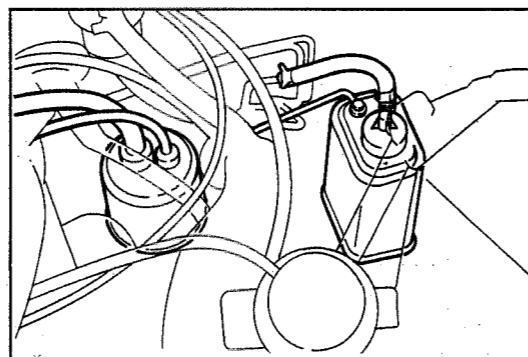
(4) Inspection of the charcoal canister

① Detach the hose band from charcoal canister.

② Disconnect the rubber hoses and remove the charcoal canister.

NOTE:

- Prior to disconnection of the rubber hose, put a tag on each of the rubber hoses so that they may be reconnected correctly to the original position.



G2MA00034-99999

③ Visual inspection of charcoal canister

Visually inspect the charcoal canister case for cracks or damage.

If any damage is found, replace the charcoal canister with new one.

④ Ensure that no air leakage is present when applying compressed air of 29.4 kPa (10.3 kgf-cm²) into the fuel tank side ② or BVSV side pipe ② while plugging the purge side ① and atmosphere side ③ pipes.

If air leakage is present, replace the charcoal canister with new one.

⑤ Ensure that the no air continuity is exist when blowing your breath into purge side ① pipe of the charcoal canister.

If air continuity is exist, replace the charcoal canister with new one.

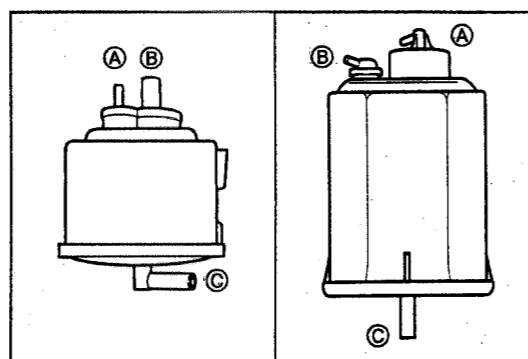
⑥ Check of charcoal canister for restriction

a. Ensure that the air continuity is existing to the atmosphere side ③ pipes, when blow your breath into the fuel tank side ② and BVSV side ② While the purge side ① pipe is plugged.

If no air continuity is exist, replace the charcoal canister with new one.

b. Ensure that the air continuity is existing when applying a negative pressure to the purge side pipe ① by Mity Vac.

If no air continuity is exist, replace the charcoal canister with new one.



⑦ Cleaning of charcoal canister

Clean the charcoal canister by blowing compressed air of 294.2 kPa (3.0 kgf/cm²) into the fuel tank side pipe ② or BVSV side pipe ② while holding the purge side of canister pipe ① closed.

NOTE:

- Do not attempt to wash the charcoal canister.
 - No activated carbon should come out during the test.
- ⑧ Install the charcoal canister to the vehicle, then reconnect the rubber hoses and attach the new hose bands.
 - ⑨ Install the charcoal canister to vehicle.
 - ⑩ Reconnect the rubber hoses and attach the new hose band.

G2MA00035-99999

(5) Inspection of Outer Vent Valve

① Disconnect the rubber hose at the BVSV side.

② Connect the suitable hose to the outer vent valve.

③ Ensure that air continuity exists.

If no air continuity exists, check to see if any abnormality is present in the electric circuit of the outer vent valve. Then replace the outer vent valve, as required.

WARNING:

- Never inhale the air during the continuity inspection.

④ Turn ON the ignition switch.

⑤ Ensure that the no air continuity exists.

If air continuity exists, check to see if any abnormality is present in the electric circuit of the outer vent valve. Then replace the outer vent valve, as required.

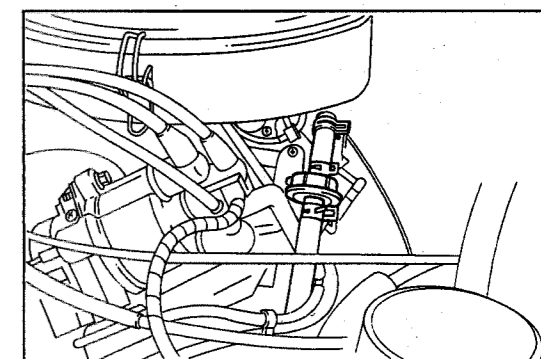
WARNING:

- Never inhale the air during the continuity inspection.

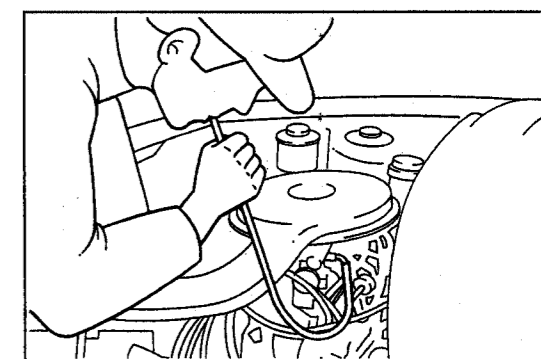
⑥ Turn OFF the ignition switch.

⑦ Disconnect the connected hose from the outer vent valve.

⑧ Connect the rubber hose from the BVSV. Attach the new hose band.



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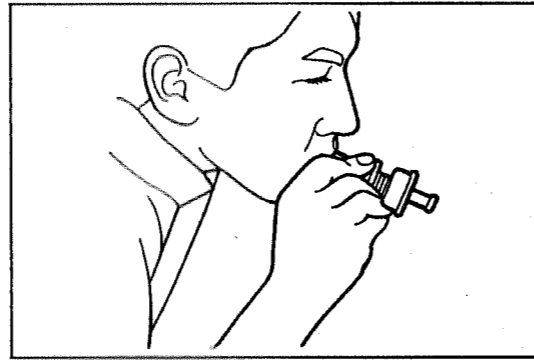


G2MA00037-99999

- (6) Inspection of the BVSV
 - ① Remove the rubber hose bands from BVSV side.
 - ② Disconnect the rubber hoses from BVSV.
 - ③ Check the air continuity of the BVSV under the following ambient temperature condition.
 - Below 45°C (113°F): No air continuity exists.
 - Above 55°C (131°F): Air continuity exists.

Replace the BVSV, as required.

- ④ Install the BVSV to the BVSV hoses.
- ⑤ Place the new hose bands.

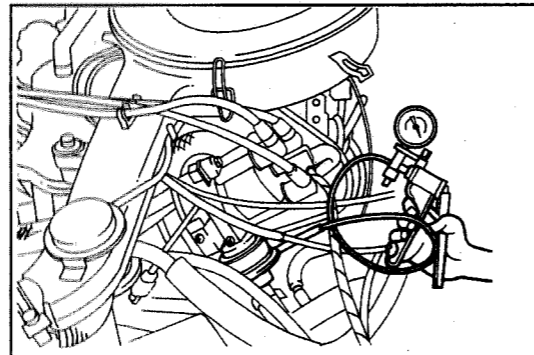


G2MA00038-99999

13. Inspection of the ignition timing advance device.

- (1) Connection of the tachometer and timing light.
 - (See procedure of inspection and adjustment of ignition timing.)
- (2) Warm up the engine thoroughly.
- (3) Stop the engine.
- (4) Disconnect the vacuum hose from the vacuum advancer.
- (5) Plug the disconnected hoses with following SST.
 - SST: 09258-00030-000
- (6) Start the engine.
- (7) Ensure that the ignition timing will be advanced according with engine revolution when the engine is raced.
 - If not repair the mechanical governor.
 - (Refer to the IG section of the service manual.)
- (8) Set the engine revolution at about 2000 rpm.
- (9) Connect the Mity Vac to the main side vacuum advancer of the distributor.

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- (10) When the vacuum pressure is applied with the Mity Vac, ensure that the ignition timing will advanced according with a applied vacuum pressure by Mity Vac.
- (11) Remove the Mity Vac from the vacuum advancer.
- (12) Connect the main side vacuum hose to the main side vacuum advancer of the distributor.
- (13) Ensure that the ignition timing will be advanced when the engine is raced.
- (14) Connect the Mity Vac to the sub side vacuum advancer of the distributor.
- (15) Connect the Mity Vac to the sub side vacuum advancer of the distributor.
- (16) When the vacuum pressure by Mity Vac.
- (17) Remove the Mity Vac from the vacuum advancer.
- (18) Connect the main side vacuum hose to the main side vacuum advancer of the distributor.
- (19) Ensure that the ignition timing will be advanced when the engine is raced.
 - If not, check and repair the vacuum hose piping.
- (20) Stop the engine.

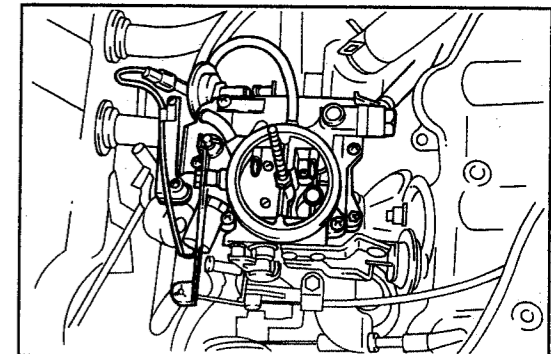
14. Inspection of throttle valve

- (1) Remove the air cleaner case.
 - (Refer to the inspection of the air cleaner element.)
- (2) Ensure that the throttle valve operates smoothly with out rattle, when accelerator pedal is depressed gradually.
 - If not, check and repair the accelerator pedal, linkage or throttle valve.
- (3) Reinstall the air cleaner case.
 - (Refer to the inspection of the air cleaner case.)

G2MA00041-00000

15. Inspection of choke valve

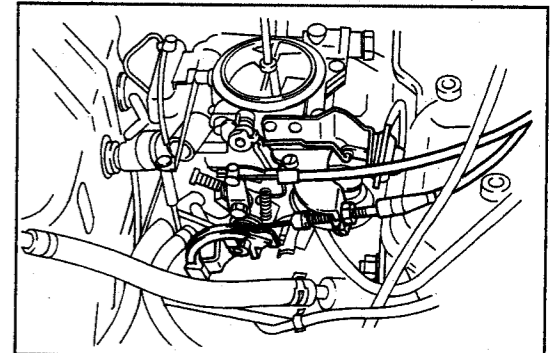
- (1) Remove the air cleaner element.
- (2) Pull the choke knob fully.
- (3) Depress the accelerator pedal once.
- (4) Ensure that the choke valve closed fully.
- (5) Push back the choke knob fully.
- (6) Ensure that the choke valve opened fully.
 - If not, repair or replace the defective part.
- (7) Reinstall the air cleaner element.



G2MA00042-99999

16. Inspection of carburetor linkage

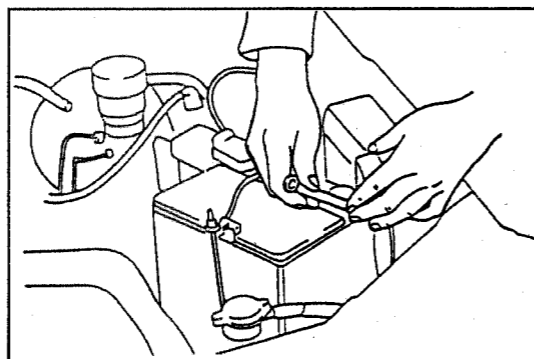
- (1) Ensure that the carburetor linkage connected properly and operate smoothly with out any rattled.



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17. Replacement of timing belt

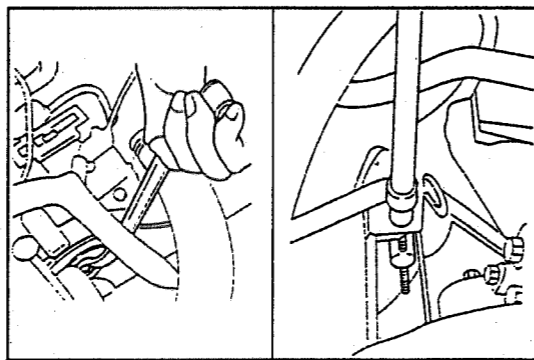
- (1) Ensure that the ignition switch turned OFF.
- (2) Disconnect the ground cable terminal from the negative terminal of the battery.



G2MA00044-99999

- (3) Removal of air conditioner belt
(Air conditioner-equipped vehicle only)

- ① Loosen the idler pulley mount nut.
- ② Loosen the adjusting bolt.
- ③ Remove the drive belt.

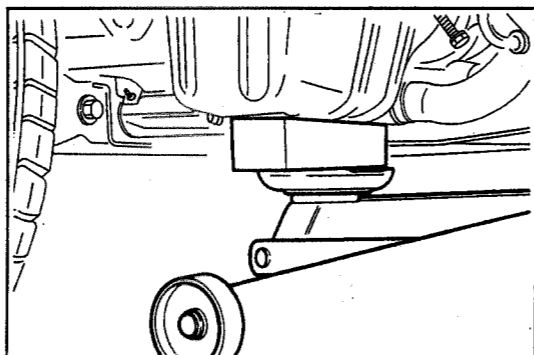


G2MA00045-99999

- (4) Slightly jack up the engine with the supporting pad of a garage jack placed underneath the oil pan.

NOTE:

- Place a suitable object, such as a wooden piece, between the oil pan and the supporting pad of the garage jack so as not to deform the oil pan.
- Care must be exercised to ensure that the interposed object is not interfering with the oil drain plug. Failure to observe this note may incur a damaged drain plug.

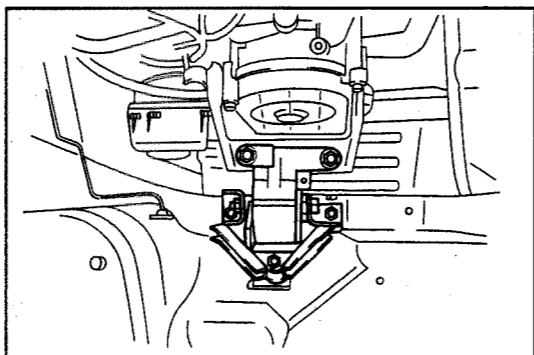


G2MA00046-99999

- (5) Remove the engine mounting front insulator with engine mounting right bracket by removing the five bolts and one nut with resistance stay.

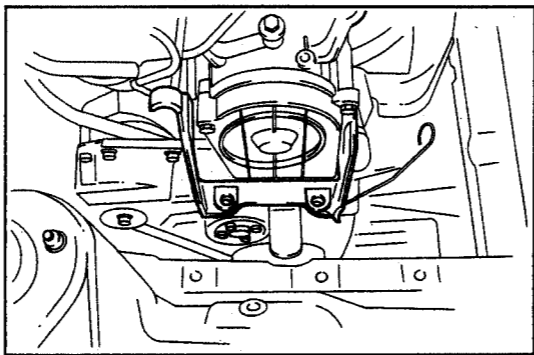
CAUTION:

- Ensure that the engine is supported by the garage jack and no load are applied to the attaching bolt of the engine mounting front insulator and engine mounting right bracket.



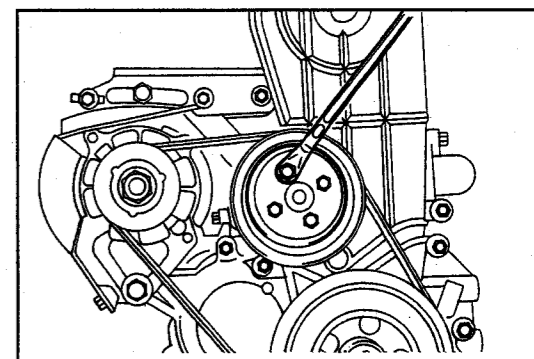
G2MA00047-99999

- (6) Remove the attaching bolts of the engine RH front mounting No. 2



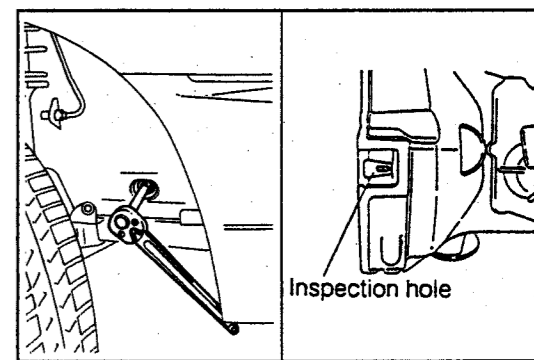
G2MA00048-99999

- (7) Loosen the attaching bolt of the water pump pulley, utilizing the tension of the V-ribbed belt.
- (8) Loosen the alternator attaching bolts.
- (9) Remove the alternator drive belt.
- (10) Remove the water pump pulley.



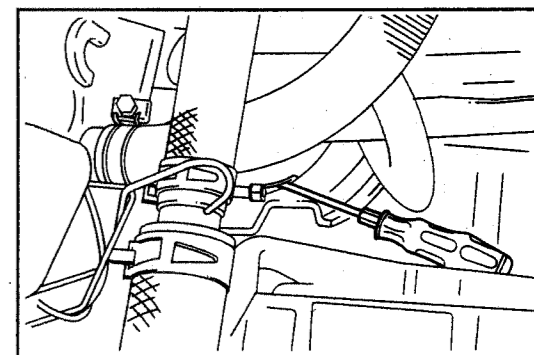
G2MA00049-99999

- (11) Set the piston No. 1 to the top dead center under the compression stroke.
Turn the crankshaft until the ignition timing mark on the flywheel is aligned with the mating mark on the bell housing. Remove the oil filler cap. Check that the valve rocker arm of the exhaust valve of the cylinder No. 1 is completely free. If the exhaust valve is pushed up, turn the crankshaft 360 degrees. Again align the ignition timing mark on the flywheel with the mating mark on the bell housing.



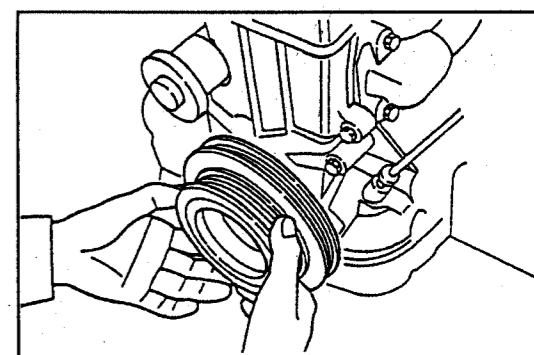
G2MA00050-99999

- (12) While preventing the ring gear from turning, using a screwdriver, remove the crankshaft pulley bolt.



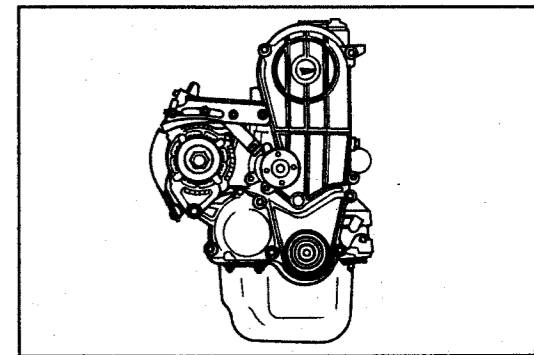
G2MA00051-99999

- (13) Remove the crankshaft pulley.



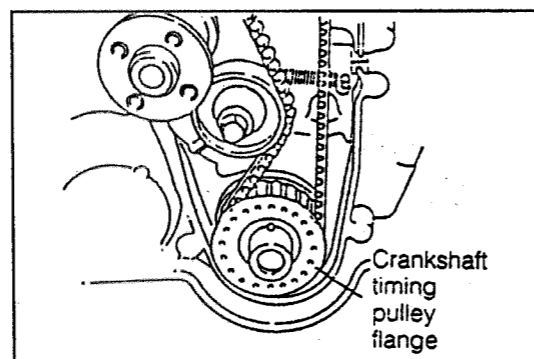
G2MA00052-99999

- (14) Remove the attaching bolts of the timing belt cover.
- (15) Remove the timing belt upper cover.
- (16) Remove the timing belt lower cover.



G2MA00053-99999

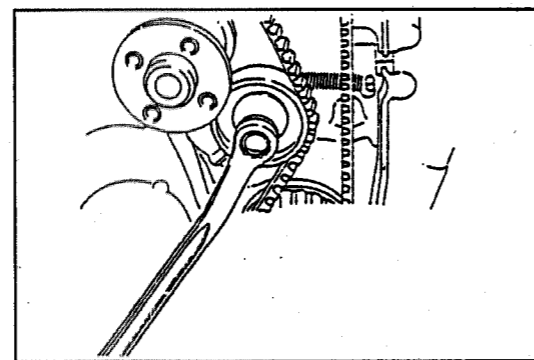
(17) Remove the crankshaft timing belt pulley flange.



G2MA00054-99999

(18) Removal of timing belt

- ① Loosen the timing belt tensioner bolt. Push the bolt to the left as far as it will go and then temporarily tighten it.

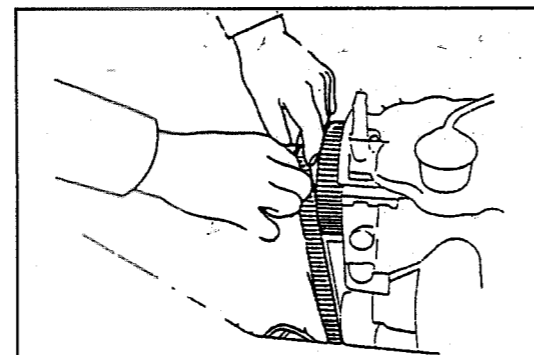


G2MA00055-99999

- ② Remove the belt.

CAUTION:

- Do not bend, twist or turn the belt inside out.
- Do not allow the belt to come into contact with oil or water.
- Do not try to pry the timing belt with a screwdriver or the like during the removal or installation.
- Do not utilize the belt tension when installing or removing the set bolt of the camshaft timing belt pulley.



G2MA00056-99999

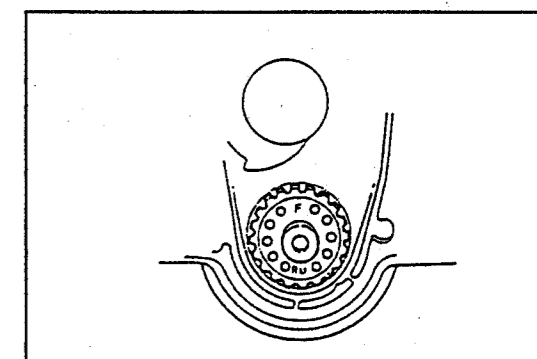
(19) Installation of timing belt

CAUTION:

- Do not try to pry the timing belt with a screwdriver or the like during the removal or installation.
- Do not allow the belt to come into contact with oil, water or dust.
- Do not bend the belt at a sharp angle or turn the belt inside out.
- Do not utilize the tension of the timing belt when tightening the set bolts of the camshaft timing belt pulley and crankshaft.
- The adjustment of the belt tension should be made when the cylinder block and its ambient temperatures are in between 5 - 50°C (41 - 122°F).
- Perform the engine turning operation at the crankshaft side.
- Do not turn the crankshaft or camshaft alone.
- When the timing belt is reused, install the timing belt in such way that the direction of the arrow mark put during the removal may match with the engine rotation direction.

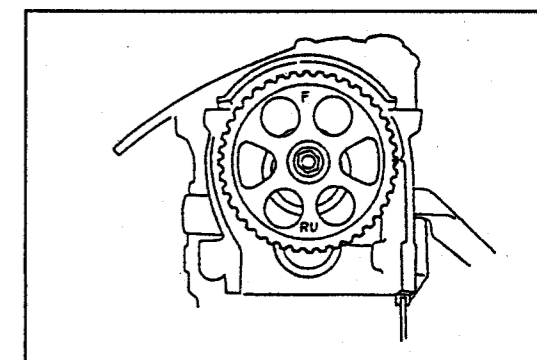
G2MA00057-00000

- ① Ensure that the mating mark of the crankshaft timing belt pulley is aligned with the mating mark on the balance shaft gear cover.
 - If the timing marks are not aligned with each other, align them. However, keep rotation of the timing belt pulley at a minimum so that the piston may not interfere with the valve.
 - Turn the crankshaft by applying a stubby screwdriver to the ring gear.



G2MA00058-99999

- ② Ensure that the mating mark of the camshaft timing belt pulley is aligned with the mating mark on the cylinder head.
 - If the timing marks are not aligned with each other, align them. However, keep rotation of the timing belt pulley at a minimum so that the piston may not interfere with the valve.

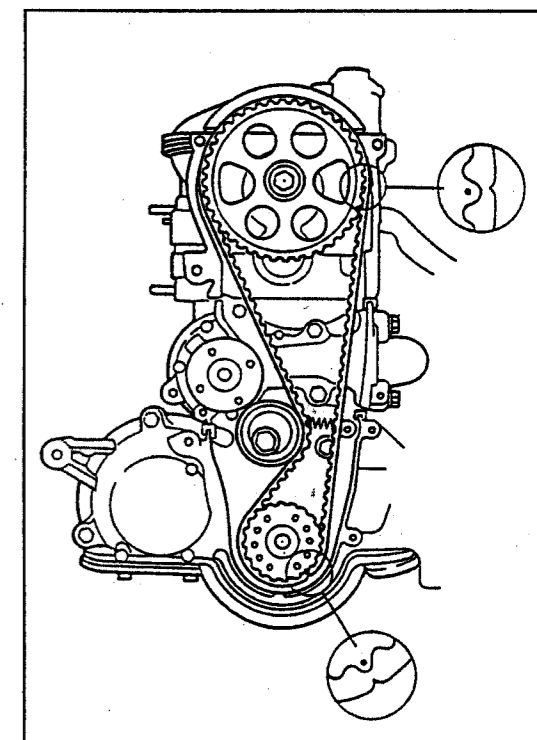


G2MA00059-99999

- ③ Assemble the timing belt such way that there exist 32 teeth of the belt between the drilled marks of crankshaft timing belt pulley and camshaft timing belt pulley.

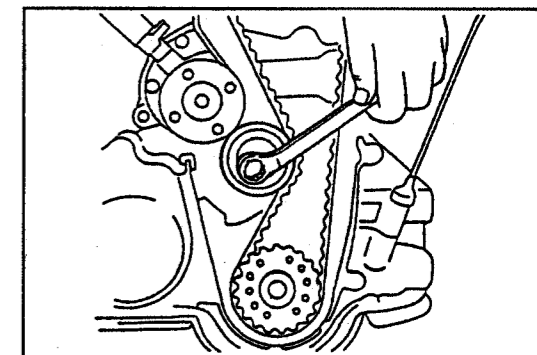
NOTE:

- When the timing belt is reused, install the timing belt in such way that the direction of the arrow mark put during the removal may match with the engine rotation direction.



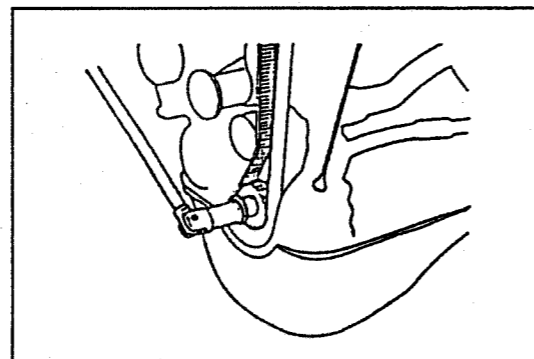
G2MA00060-99999

- ④ Loosen the attaching bolt of the idler pulley. Apply tension to the timing belt by means of the tension spring. Then, temporarily tighten the attaching bolt again.



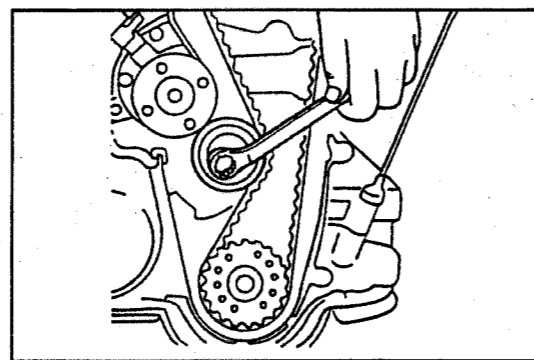
G2MA00061-99999

- ⑤ Screw in the crankshaft pulley bolt to the crankshaft. Turn the crankshaft two turns and stop it when the piston No. 1 reaches the top dead center. During this operation, never turn the crankshaft reversely. If the crankshaft is reversed, turn the crankshaft two turns again. Then, stop the crankshaft when the piston No. 1 reaches the top dead center.



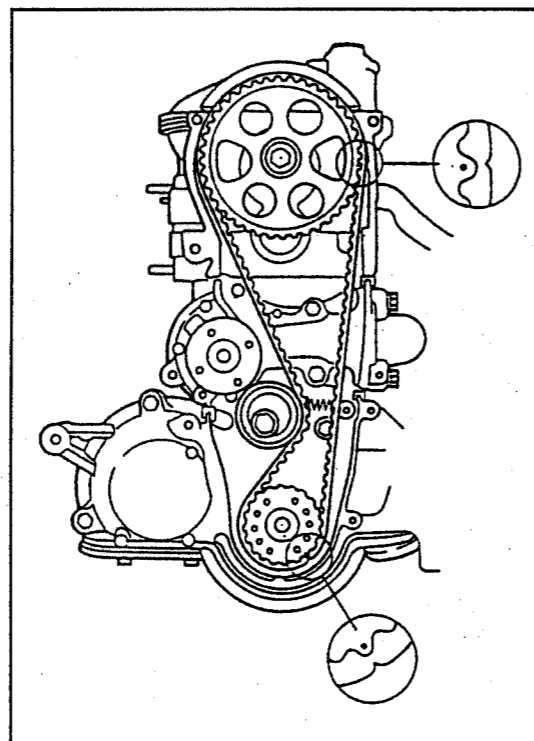
G2MA00062-99999

- ⑥ Loosen the attaching bolt of the idler pulley. Apply tension to the timing belt by means of the tension spring. Tighten the attaching bolt again.
Tightening Torque: 29.4 - 44.1 N·m
(3.0 - 4.5 kgf-m, 24.6 - 32.5 ft-lb)



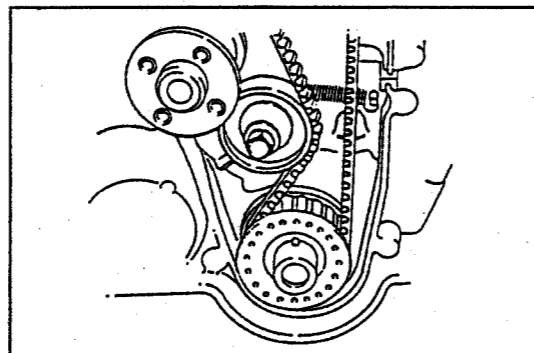
G2MA00064-99999

- ⑦ Ensure that the mating marks on the crankshaft and camshaft timing belt pulleys are aligned with the corresponding mating marks on the timing belt. If they are not aligned, remove the timing belt again and perform the operations starting from Step (1).



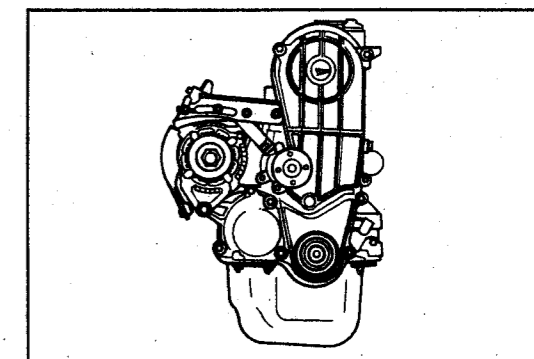
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- (20) Installation of crankshaft timing belt pulley flange
Install the crankshaft timing belt pulley flange with the protruding side facing toward the crankshaft timing belt pulley.



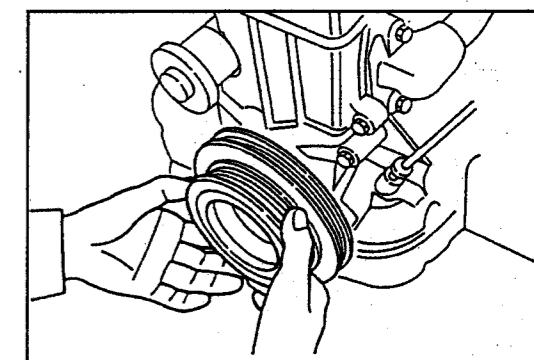
G2MA00066-99999

- (21) Install the timing belt lower cover with its gasket.
Tightening Torque: 2.0 - 3.9 N·m
(0.2 - 0.4 kgf-m, 1.4 - 2.9 ft-lb)



G2MA00067-99999

- (22) Install the timing belt upper cover with the gasket interposed.
Tightening Torque: 2.0 - 3.9 N·m
(0.2 - 0.4 kgf-m, 1.4 - 2.9 ft-lb)



G2MA00068-99999

- (23) Installation of crankshaft pulley
① Insert the crankshaft pulley with the key groove on the crankshaft pulley aligned with the crankshaft key.
② Tighten the crankshaft pulley bolt.
Tightening Torque: 88.3 - 98.0 N·m
(9.0 - 10.0 kgf-m, 65.1 - 72.0 ft-lb)

NOTE:

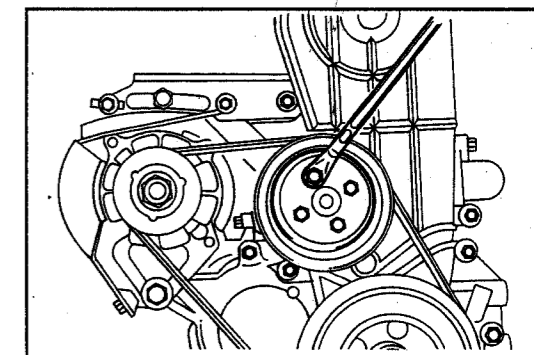
- When installing the crankshaft pulley bolt, both the bolt and bolt hole of the crankshaft pulley should be dry.
- During the bolt tightening, prevent the ring gear from turning, using a stubby screwdriver.

- (24) Install the water pump pulley to the water pump pulley temporarily tighten the attaching bolt by hand.
(25) Install the alternator drive belt (V-ribbed belt).

NOTE:

- Make sure that the drive belt (V-ribbed belt) is fitted properly in the groove of each pulley.

- (26) Adjustment of alternator drive belt tension.



G2MA00069-99999

- (27) Tighten the attaching bolts of the water pump pulley by utilizing the tension of V-ribbed belt.
Tightening Torque: 5.9 - 8.8 N·m
 (0.6 - 0.9 kgf·m, 4.3 - 6.5 ft·lb)

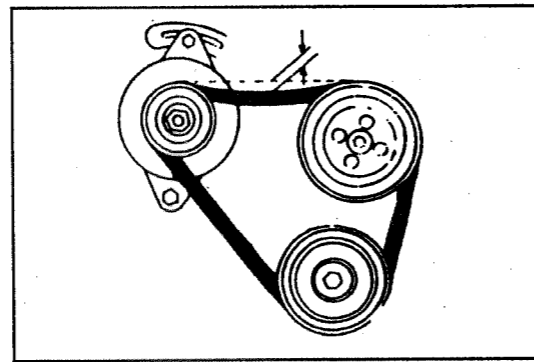
- (28) Ensure that the drive belt deflection meets with the specified value when the midpoint between the water pump pulley and the alternator drive pulley is pushed with a force of 98.1 N·m (10 kgf, 22 lb).
 (See page MA-10.)
 If the deflection dose not confirm to the specification, perform the adjustment so that the specification may be satisfied.

- (29) Install the engine RH front mounting No. 2.
Tightening Torque:
M10: 29.4 - 44.1 N·m
 (3.0 - 4.5 kgf·m, 21.7 - 32.5 ft·lb)
M12: 49.0 - 68.6 N·m
 (5.0 - 7.0 kgf·m, 36.2 - 50.6 ft·lb)

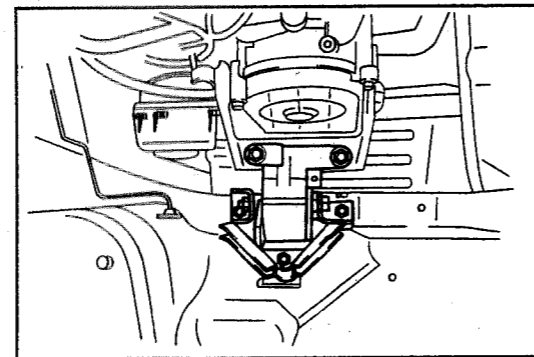
- (30) Install the engine mounting front insulator with the engine mounting right bracket by five attaching bolts and one nut.
Tightening Torque: 29.4 - 44.1 N·m
 (3.0 - 4.5 kgf·m, 21.7 - 32.5 ft·lb)

- (31) Remove the garage jack from under the oil pan.
 (32) Installation and adjustment of air conditioner compressor drive belt.
 ① Install the air conditioner compressor drive belt.
 ② Adjust the belt tension by idler pulley adjusting bolt.
 ③ Tighten the idler pulley attaching nut.
Tightening Torque: 31.4 - 47.1 N·m
 (3.2 - 4.8 kgf·m, 23.1 - 34.7 ft·lb)

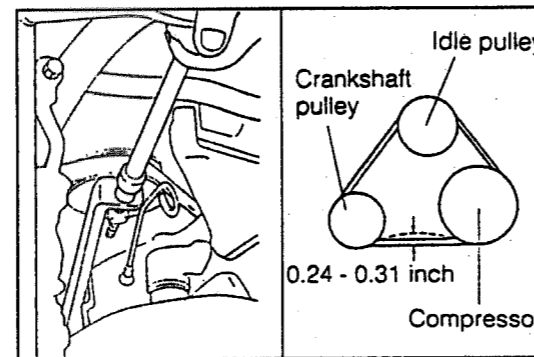
- (33) Connect the bonding wire to the engine mounting bracket.
 (34) Connect the engine ground cable terminal to the negative terminal of the battery.
 (35) Start the engine and no abnormal noise emitted.



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G2MA00071-99999



G2MA00072-99999

HOT ENGINE OPERATION

1. Inspection of engine oil

- (1) Oil quality check
 ① Park the vehicle on a level surface.
 ② Pull out the dipstick out and wipe off the engine oil.
 ③ Reinsert the dipstick as far as it will go.
 ④ Pull out the dipstick again and check the oil level if it is between "F" and "L" marks.
 ⑤ Ensure that the engine oil level should be between the "L" and "F" level on the dipstick.
 If engine oil level is less than the "L" level check the oil leakage.
 If engine oil level is less than the "L" level, replenish the specified engine oil to the "F" level after the checking of the oil leakage.

NOTE:

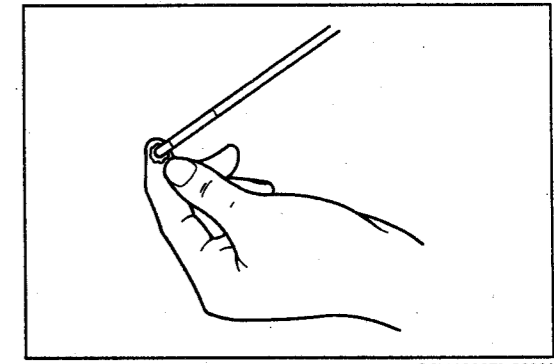
- The amount of oil between the "L" level and the "F" level equals to one liter.
- ⑥ Check the engine oil for deterioration, ingress of water, discoloring or dilution.
 If oil quality is poor, change the engine oil.
 (See procedure of change of engine oil and oil filter section.)
- ⑦ Reinsert the dipstick as far as it will go.

(2) Oil level check

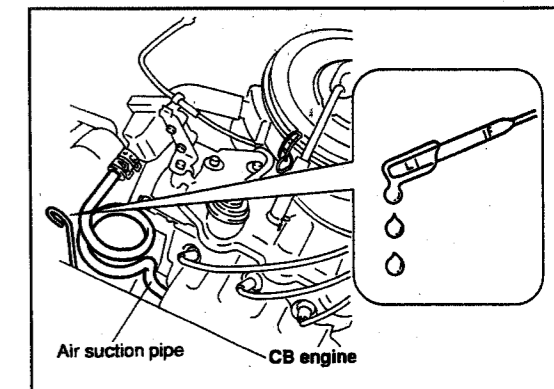
- ① Park the vehicle on a level surface.
 ② Pull out the dipstick out and wipe off the engine oil.
 ③ Reinsert the dipstick as far as it will go.
 ④ Pull out the dipstick again.
 ⑤ Ensure that the engine oil level should be between the "L" and "F" level on the dipstick.
 If engine oil level is less than the "L" level check the oil leakage.
 If engine oil level is less than the "L" level, replenish the specified engine oil to the "F" level after the checking of the oil leakage.

NOTE:

- Use API grade SE or higher multigrade viscosity, fuel-efficient oil. (See the procedure of change of engine oil and oil filter section.)
- The amount of oil between the "L" level and the "F" level equals to one liter.

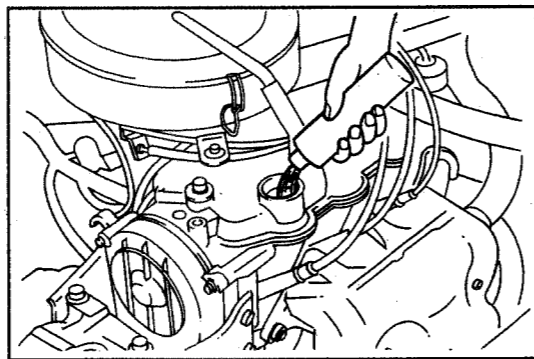


G2MA00073-99999



G2MA00074-99999

- ⑥ Warm up the engine to normal operating temperature.
- ⑦ Stop the engine.
- ⑧ After few minutes, slowly pull out the dipstick out and wipe off the engine oil.
- ⑨ Reinsert the dipstick as far as it will go.
- ⑩ Pull out the dipstick again and check the oil level if it is between "F" and "L" marks.
If the engine oil level is low, replenish the specified engine oil to the "F" level of the dipstick.
(See procedure under pour engine oil to the engine.)



G2MA00075-99999

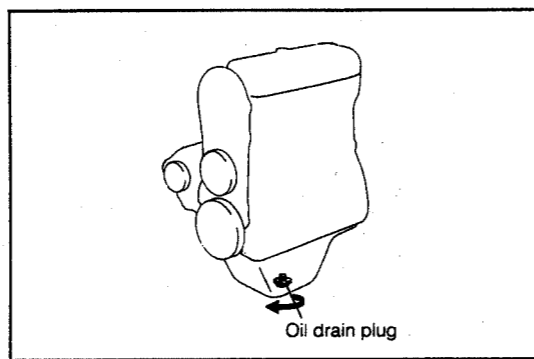
- ⑪ Reinsert the dipstick as far as it will go.
- (3) Inspection of engine oil leakage
 - ① Check the oil level.
(See the inspection of the oil level.)
 - ② Start the engine.
 - ③ Ensure that the no oil leakage is present.
Repair or replace the defective part, if oil leakage is present.

2. Change of engine oil and oil filter

WARNING:

- Protect your eyes by wearing the safety glasses.
- Be very careful not to burn yourself with hot engine oil or hot engine components.

- (1) Park the vehicle on a level surface.
- (2) Check the oil level. (See the inspection of the oil level.)
- (3) Start the engine.
- (4) Warm up the engine to normal operating temperature.
- (5) Place a suitable container under the oil drain plug.
- (6) Remove the drain plug and gasket, and drain the engine oil into the placed container completely.
- (7) Remove the oil filler cap.
- (8) Place a suitable container under the oil filter.
- (9) Slacken the oil filter using the following SST.
SST: 09228-87201-000



G2MA00076-99999

CAUTION:

- Be careful, at this time oil may flow out.

- (10) Remove the oil filter by hand.
- (11) Wipe off the engine oil from the oil filter attaching part of the engine.
- (12) Thinly apply engine oil to the O-ring of the new oil filter.
- (13) Screw in the oil filter by hand, until the O-ring of the oil filter contacts the oil filter installing surface.

- (14) Tighten the oil filter three fourths to one complete turn, using the following SST or by hand.
SST: 09228-87201-000

CAUTION:

- Do not overtighten the oil filter. Failure to observe this caution will cause oil leakage or damage of oil pump or oil filter.

- (15) Tighten the drain plug to the specified torque with new gasket interposed.
Tightening Torque: 19.6 - 29.4 N·m
(2.0 - 3.0 kgf-m, 14.5 - 21.7 ft-lb)

- (16) Pour engine oil to the engine.

NOTE:

- Use API grade SE or higher multigrade viscosity, fuel-efficient oil.
- The amount of oil between the "L" level and the "F" level equals to one liter.

Unit: Liter

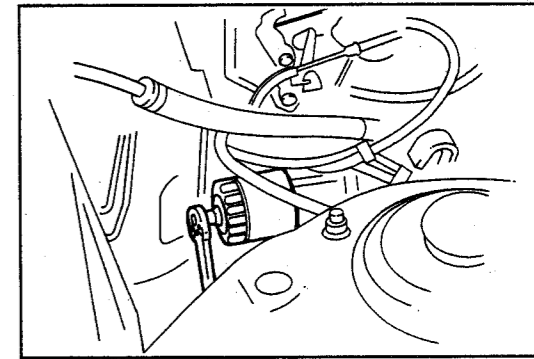
F level	2.7
L level	1.7
Oil capacity When oil filter replaced	3.0
Full capacity	3.2

- (17) Pull out the dipstick out and wipe off the engine oil.
- (18) Reinsert the dipstick as far as it will go.
- (19) Pull out the dipstick again.
- (20) Ensure that the engine oil level should be between the "L" and "F" level on the dipstick.
If engine oil level is less than the "L" level, replenish the specified engine oil to the "F" level.
- (21) Close the oil filler cap.

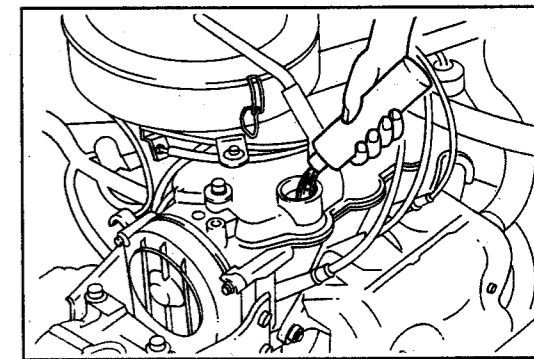
WARNING:

- Securely install the oil filler cap. Failure to observe this warning will cause a fire.

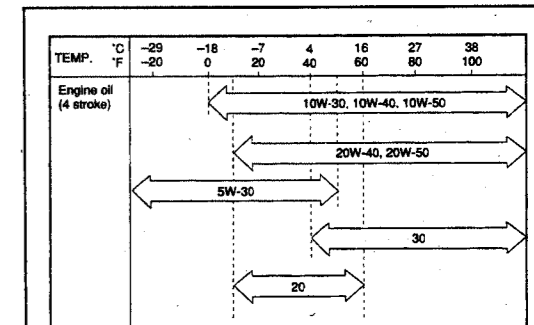
- (22) Start the engine.
- (23) Warm up the engine to normal operating temperature.
- (24) Stop the engine.



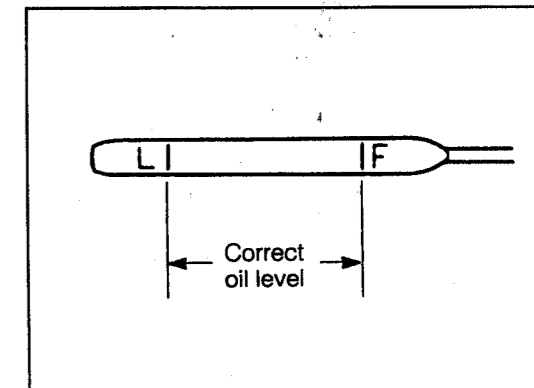
G2MA00077-99999



G2MA00000-99999



G2MA00078-99999



G2MA00079-99999

- (25) After few minutes, slowly pull out the dipstick out and wipe off the engine oil.
- (26) Reinsert the dipstick as far as it will go.
- (27) Pull out the dipstick again and check the oil level if it is between "F" and "L" marks.
If the engine oil level is low, replenish the specified engine oil to the "F" level of the dipstick.
- (28) Reinsert the dipstick as far as it will go.

G2MA00080-00000

3. Inspection of engine starting and abnormal noise.

- (1) Ensure that the engine can start smoothly with out any abnormal noise.

G2MA00081-00000

4. Inspection of spark plug

- (1) Inspection of electrode
When megger (insulation resistance meter) is used:
① Carefully disconnect the resistive cords from the spark plugs by holding their rubber boot section.

NOTE:

- Do not disconnect the resistive cords by holding the code section of the resistive codes.
- ② Measure the insulation resistance of the spark plug.
Minimum Insulation Resistance: 15 MΩ

WARNING:

- Since the spark plugs are hot, care must be exercised to avoid getting scalded.

If the measured insulation resistance is less than specified, proceed to the step (2).

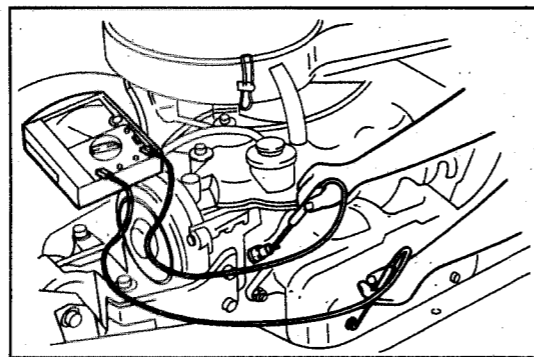
When a megger is not available:

- ① Start the engine. Warm up the engine completely.
- ② Race the engine at 4000 rpm for five seconds.
- ③ Remove the spark plug.

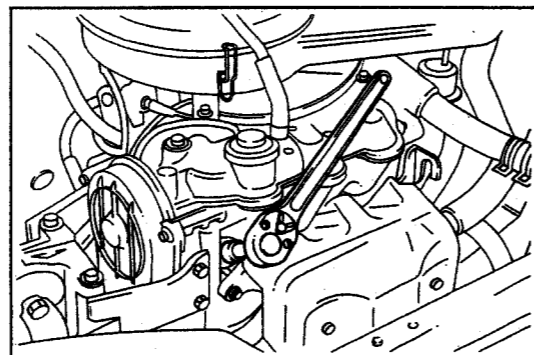
WARNING:

- Since the spark plugs are hot, care must be exercised to avoid getting scalded.

- Visually inspect the spark plug.
If the electrode is dry: Satisfactory
If the electrode is wet: Proceed to the step (4).



G2MA00082-99999

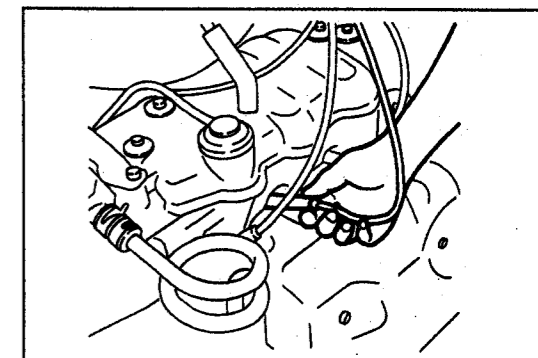


G2MA00083-99999

- (2) Removal of the spark plug
① Carefully remove the resistive cords from the spark plugs by holding their rubber boot section.

NOTE:

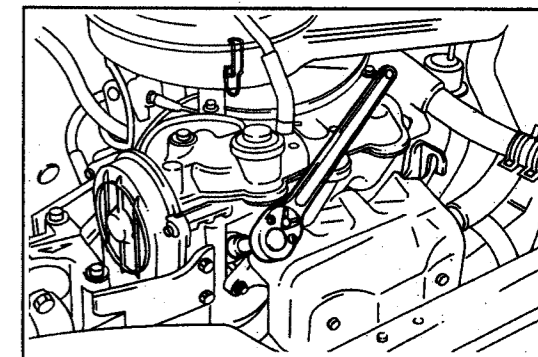
- Do not disconnect the resistive cords by holding the code section of the resistive codes.
- ② Remove the spark plug.



G2MA00084-99999

- (3) Visual inspection of spark plug
Visually inspect the spark plug for electrode wear, thread or insulator damage. Replace the spark plug if it exhibits damage.
Recommended Spark Plug

	NIPPONDENSO	NGK
For European Specification	W16EXR-U	BPR5EY
Except for European Specification	W16EX-U	BP5EY



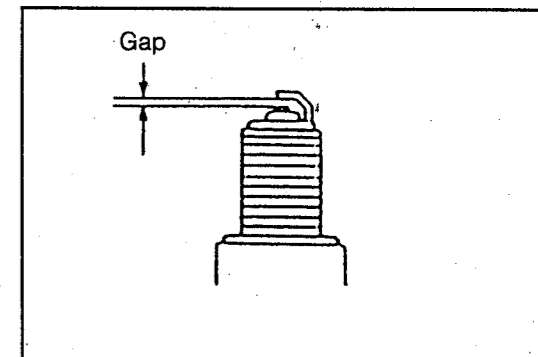
G2MA00085-99999

NOTE:

- All spark plugs should have the same heat range and be ones manufactured by the same manufacturer.

- (4) Inspection of electrode gap
Measure the electrode gap, using the plug gap gauge.
Electrode Gap:
NIPPONDENSO: 0.7 - 0.8 mm
(0.028 - 0.031 inch)
NGK: 0.8 - 0.9 mm (0.031 - 0.035 inch)

If the electrode gap of a used spark plug is not within the specification, replace the spark plug with new one. If the electrode gap of a new spark plug is not within the specification, adjust the gap by bending the base of the ground electrode, being careful not to touch the tip.



G2MA00086-99999

- (5) Cleaning the spark plug
If the electrode has traces of wet carbon, dry the electrode and clean it with a spark plug cleaner.

Air Pressure: Not to exceed 588.4 kPa
(6 kgf/cm², 85 psi)

Duration: Less than 20 seconds

NOTE:

- If there are trace of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.

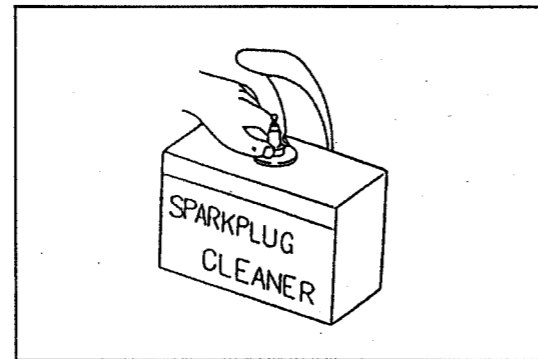
- (6) Inspection of spark plug insulation resistance
More Than: 20 MΩ

If the insulation resistance is less than the specified value, replace the spark plug with the new one.

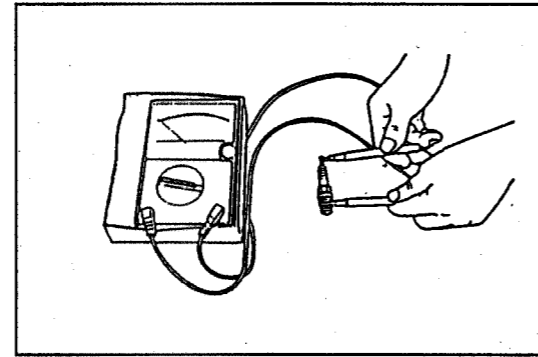
- (7) Installation of spark plug
Install the spark plugs. Tighten them to the specified torque.

Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf·m,
10.8 - 15.9 ft·lb)

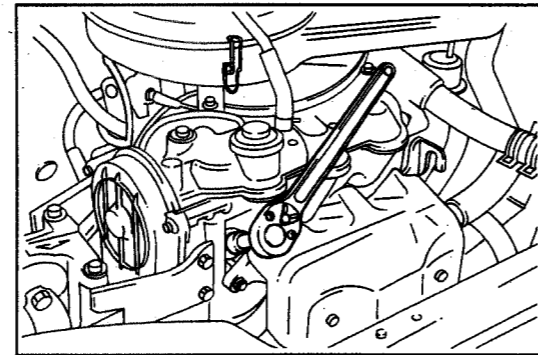
- (8) Connect the resistive cords to the spark plug.



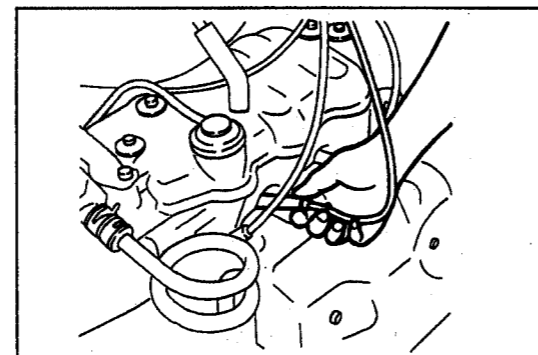
G2MA00087-99999



G2MA00088-99999



G2MA00089-99999



G2MA00090-99999

5. Inspection of distributor cap and rotor

- (1) Ensure that the ignition switch is turned OFF.
- (2) Disconnect the resistive cords from the distributor cap.

NOTE:

- Do not hold the wire section of the resistive cord during the disconnection, be sure to disconnect the resistive cord by holding the grommet section of the resistive cord.

- (3) Remove the distributor cap by removing the attaching bolts of the distributor cap.

- (4) Ensure that the distributor cap have no cracks or any other damage.

- (5) Ensure that the center carbon has no noticeably wear. If the excessive wear is found replace the center carbon.

NOTE:

- Replacement should be performed with rotor and center carbon as a set.

- (6) Ensure that the electrode has no excessive electrical corrosion.

If excessive electrical corrosion is found remove it by the baking soda water. Do not remove it by screw driver or the like.

- (7) Remove the distributor rotor by pull it out.

- (8) Ensure that the distributor rotor has no cracks or other damage.

If damage is found replace the rotor with new one.

NOTE:

- Replacement should be performed with rotor and center carbon as a set.

- (9) Ensure that the electrode has no corrosion.

If corrosion is found remove the electrical corrosion by baking soda water.

NOTE:

- Do not remove the electrical corrosion by file or hard material made tools.

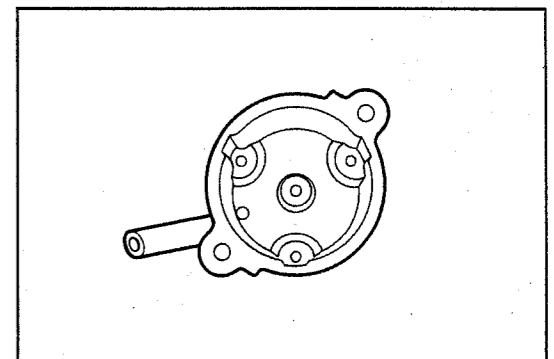
- (10) Install the distributor rotor to the distributor securely.

- (11) Replace the distributor cap gasket with new one.

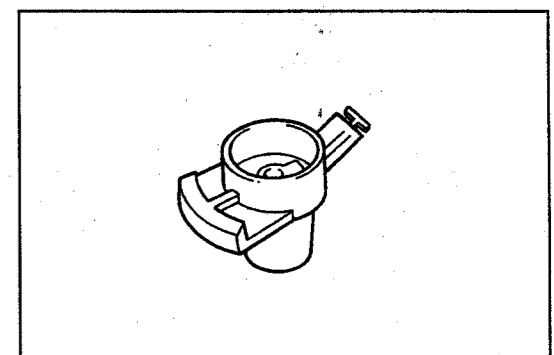
- (12) Install the distributor cap to the distributor.

- (13) Install the distributor cap attaching bolts and tighten them evenly.

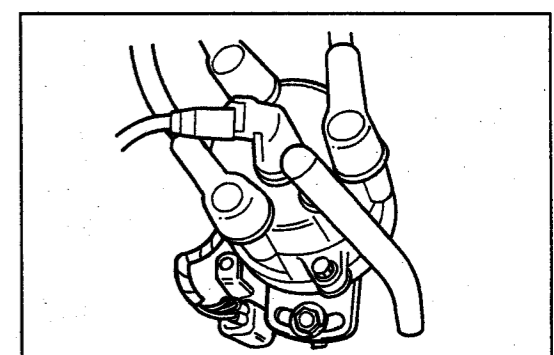
- (14) Connect the resistive cords to the distributor cap by following the manner described on the GI section of the service manual.



G2MA00091-99999



G2MA00092-99999



G2MA00093-99999

MA-32

6. Inspection and adjustment of valve clearances

The measurement and adjustment of valve clearance are carried out when each of the piston of the No. 1 cylinder is set to the top dead center at the end of compression stroke.

- NOTE:
- The valve clearance adjustment is performed normally when the engine is in a hot condition. "Hot engine condition" denotes a condition in which the cooling water temperature is 75 - 85°C (167 - 185°F) and the engine oil temperature is above 65°C (149°F). However, when the engine has been overhauled, it is necessary to adjust the valve clearances while the engine is cold and to readjust the valve clearance in a hot condition after warming up the engine.

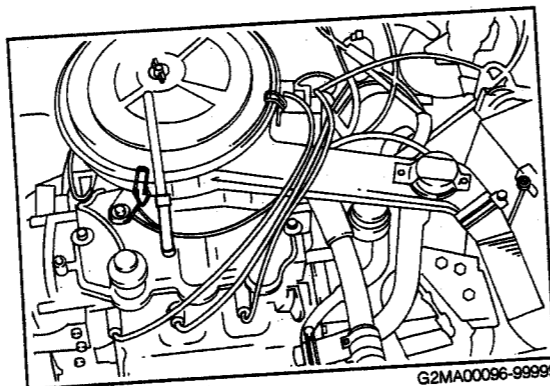
- (1) Removal of the cylinder head cover
- Detach the resistive cords from the clamps.
 - Detach the resistive cords at the cylinder head side.

NOTE:

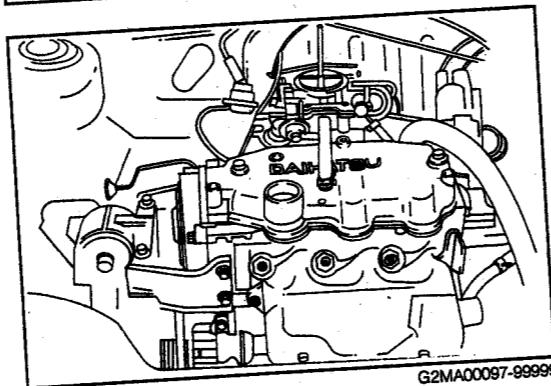
- Be sure to hold the rubber boot during the resistive cord disconnection. Never remove the resistive cord, holding the cord portion.

- Disconnect the blow-by gas hose from the air cleaner case.

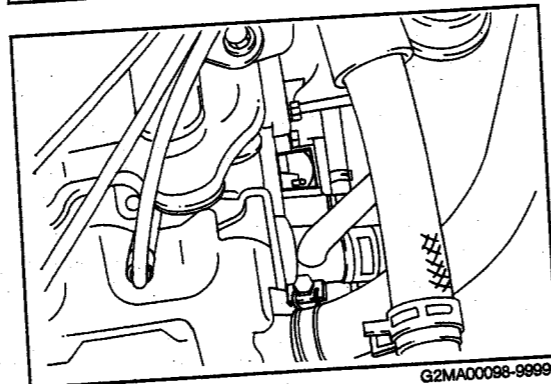
- Removal of air cleaner case from the cylinder head.
 - Remove the attaching bolt of air cleaner from the cylinder head cover.
 - Remove the wing nut.
 - Disconnect the vacuum hoses.
 - Gradually lift up the air cleaner case.
- Disconnect the accelerator cable and choke cable.
- Remove the oil filler cap.



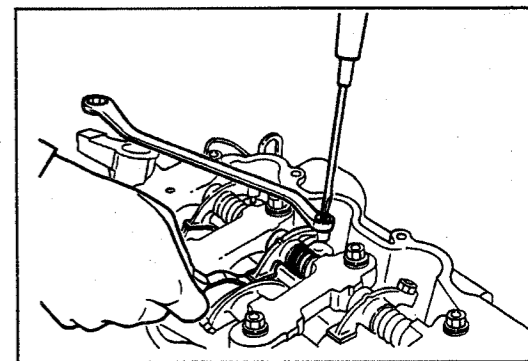
- Remove the attaching bolts.
- Remove the cylinder head cover.



- (2) Inspection and adjustment of valve clearances
- Turn the crank shaft until the recessed mark on the crankshaft pulley is aligned with the indicator mark on the timing belt cover.
 - Check to see if valve rocker arms of the No. 1 cylinder are free or are being pushed up. According to the table below, check and adjust the valve clearances, using a thickness gauge.



Cylinder		1	2	3
		When valve rocker arms of No. 1 cylinder are free: (Top Dead Center under compression stroke)	IN EX	○ ○
When valve rocker arms of No. 1 cylinder are being pushed up: (Intake valve and exhaust valve are overlapped)	IN		○	
	EX			○



NOTE:

- For the intake valve adjustment it is necessary to prepare a stubby screwdriver with a stem whose length is not more than 50 mm (2.0 inches).

Valve Clearances (hot)

Intake: 0.15 - 0.25 mm (0.006 - 0.010 inch)

Exhaust: 0.15 - 0.25 mm (0.006 - 0.010 inch)

Reference (cold)

Intake: 0.10 - 0.20 mm (0.0039 - 0.0079 inch)

Exhaust: 0.10 - 0.20 mm (0.0039 - 0.0079 inch)

- Turn the crankshaft 360 degrees. Proceed to check and/or adjust the valve clearances which have not yet been checked.

(3) Installation of cylinder head cover

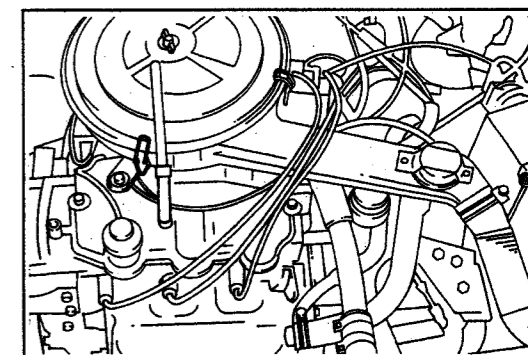
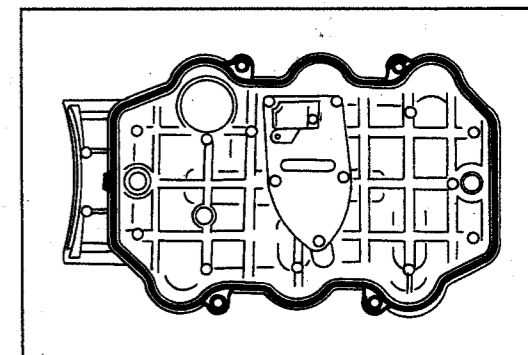
- Check the cylinder head cover gasket for damage. Replace the gasket, as required.
- Install the cylinder head cover on the cylinder head with the gasket interposed.

Tightening Torque: 7.8 - 11.8 N·m
(0.8 - 1.2 kgf-m, 5.8 - 8.7 ft-lb)

- Install the oil filler cap.
- Connect the accelerator cable and choke cable.
- Installation of air cleaner assembly
 - Place the air cleaner on the engine.
 - Connect the vacuum hoses.
 - Tighten the attaching bolt and wing nut.
- Connect the blow-by gas hose.
- Install the resistive cords.
- Start the engine.
- Ensure that the engine exhibits no oil leakage.

NOTE:

- If the engine exhibits any troubles, repair them depending on the situation.



7. Inspection and adjustment of ignition timing

NOTE:

- The ignition timing inspection or adjustment is performed normally when the engine is in a Hot condition. "Hot engine condition" denotes a condition in which the cooling water temperature is 75 - 85°C (167 - 185°F) and the engine oil temperature is above 65°C (149°F).

- Start the engine.
- Warm up the engine.
- Stop the engine.
- Connection of tachometer.
 - Disconnect the connector of the ignition coil.
 - Connect the following SST between ignition coil and vehicle side of ignition coil connector. (If your tachometer is clamp on type this operation is unnecessary.)
SST: 09991-87604-000
 - Connect the tachometer to the engine.

CAUTION:

- Never allow the tachometer terminal to touch ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility with your unit before its use.

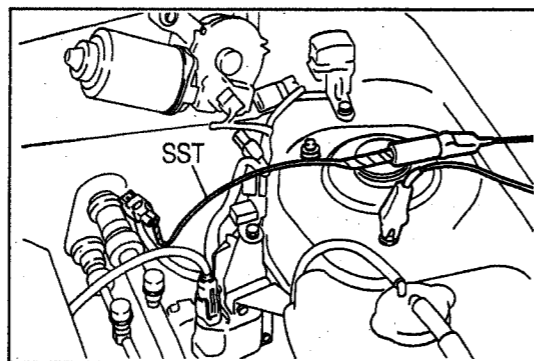
REFERENCE:

Engine tachometer

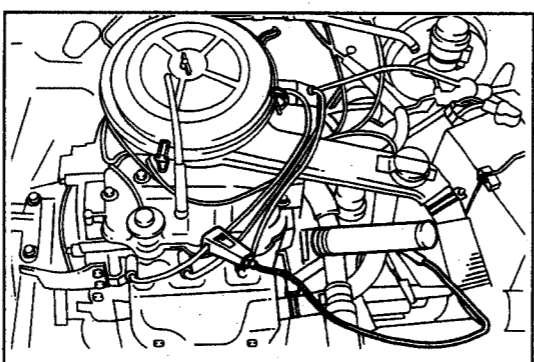
- In the case of a tachometer which picks up signals from the primary circuit and is not provided with a 3-cylinder range, take a reading of the revolution speed on a 6-cylinder range. Then, multiply this reading by 2. This value is the actual revolution speed for the 3-cylinder engine.

- Connect a timing light to the resistive cord of the No. 1 cylinder (at the timing belt side.).
- Disconnect the vacuum hose at the sub-side of the vacuum advancer of distributor.
- Plug the disconnected vacuum hose, using the following SST.
SST: 09258-00030-000

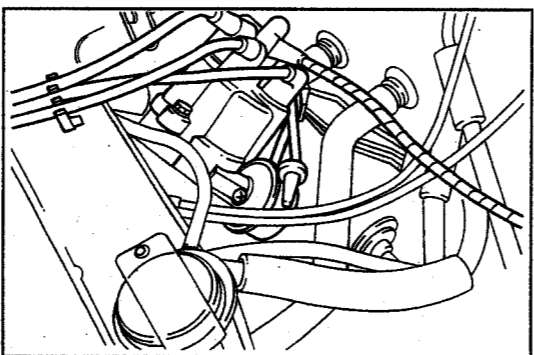
- Start the engine.
- Ensure that the engine revolution speed is bellow 1000 rpm and stable.
If the engine revolution exceeds 1000 rpm or it is unstable, adjust the engine revolution speed to the idle speed. (See page MA-36)



G2MA00102-99999



G2MA00104-99999



G2MA00105-99999

- Check to see if the ignition timing mark of the fly wheel is aligned with the indicator of the engine rear end plate, using the timing light.
Adjust the ignition timing by turning the distributor, if the ignition timing mark is not aligned with indicator.
- Adjustment of ignition timing
 - Loosen the distributor attaching bolts.
 - Adjust the distributor installation angle by turning the distributor, until the ignition timing mark of the flywheel is aligned with the indicator of the engine rear end plate.

REFERENCE:

- If the distributor is turned clockwise, the timing will be advanced. Conversely, if the distributor is turned counterclockwise, the ignition timing will be retarded.
- Tighten the distributor attaching bolts to the specified torque, making sure that the ignition timing is not disturbed.
Tightening Torque: 14.7 - 21.6 N·m
(1.5 - 2.2 kgf-m, 10.8 - 15.9 ft-lb)

- Stop the engine.
- Remove the tachometer.
- Remove the SST from ignition coil connectors.
- Reconnect the ignition coil connector.
- Remove the SST from vacuum hose end.
- Connect the vacuum hose at the sub-side of the vacuum advancer of distributor.
- Adjust the idle speed. (See page MA-36)

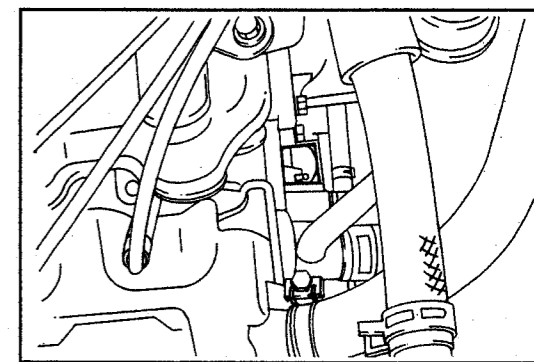
8. Inspection and adjustment of idle speed

Preparation to be made prior to idle speed adjustment.

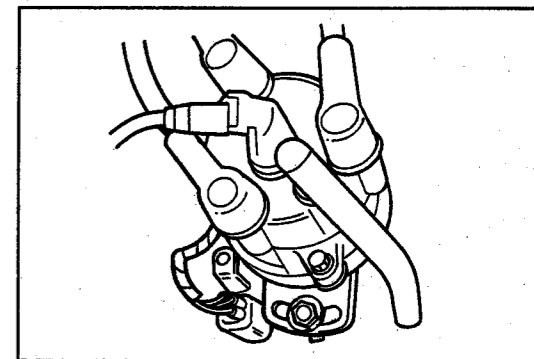
- Check and adjust the ignition timing.
- Apply the parking brake fully.
- Warm up the engine thoroughly. (continue engine warm-up for another 10 minutes after the the fan motor has started its operation.)
- All accessory switches are turned OFF.
- The air cleaner element is installed.
- All vacuum hose are connected.
- Ensure that the intake system exhibits no air leakage.
- Ensure that the exhaust system exhibits no air leakage.
- The shift lever is placed in the neutral position.
- The choke valve is open fully.

NOTE:

- Do not perform the engine idle speed adjustment while the fan motor is functioning.
- Use the SST (09243-00020-000) to adjust the idle mixture adjusting screw.



G2MA00106-99999



G2MA00107-99999

(1) Connection of tachometer

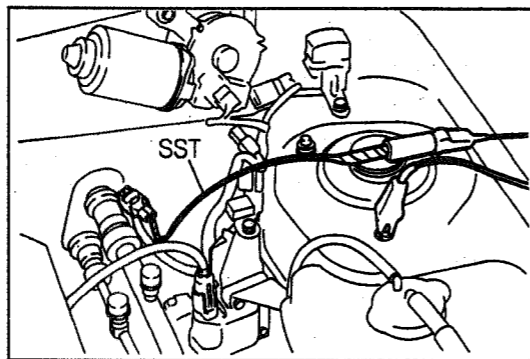
- ① Connect the following SST between ignition coil and vehicle side of ignition coil connector.
SST: 09991-87604-000

(If your tachometer is clamp on type this operation is unnecessary.)

CAUTION:

- Never allow the tachometer terminal to touch ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility with your unit before its use.

- ② Connect the tachometer to the engine, following by instruction of the manufacturer of tachometer.



G2MA00109-99999

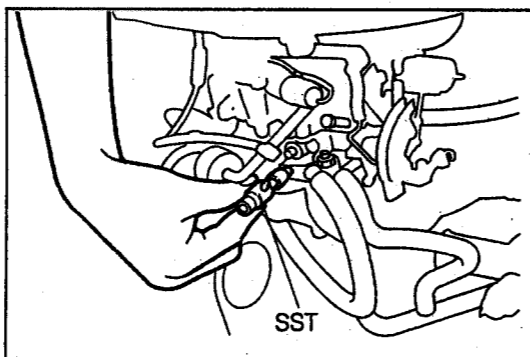
- (2) Back off the idle mixture adjusting screw four turns from the fully closed state.

NOTE:

- For this adjustment, it is necessary to prepare the following SST.

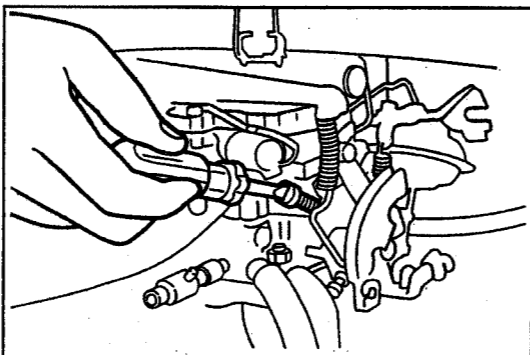
SST: 09243-00020-000

- Do not adjust the idle mixture adjusting screw, if HC/CO meter is not available.
- Be sure to inspect the HC/CO concentrations, when idle mixture adjusting screw is adjusted.



G2MA00110-99999

- (3) Start the engine.
- (4) Adjust the throttle adjusting screw so that the engine idle speed may become the specified value.
Specified Idle Speed: 850 ± 50 rpm



G2MA00111-99999

- (5) Stop the engine.
- (6) Remove the tachometer.
- (7) Remove the SST.
- (8) Connect the ignition coil.

9. Inspection and adjustment of dashpot

Preparation to be made prior to throttle positioner check.

- Check and adjust the ignition timing.
- Check and adjust the idle speed.
- Apply the parking brake fully.
- Warm up the engine thoroughly. (continue engine warm-up for another 10 minutes after the fan motor has started its operation.)
- All accessory switches are turned OFF.
- The air cleaner element is installed.
- All vacuum hose are connected.
- Ensure that the intake system exhibits no air leakage.
- Ensure that the exhaust system exhibits no air leakage.
- The shift lever is placed in the neutral position.
- The choke valve is open fully.

NOTE:

- Do not perform the throttle positioner adjustment while the fan motor is functioning.
- Use the SST (09243-00020-000) to adjust the idle mixture adjusting screw.

G2MA00112-00000

(1) Connection of tachometer

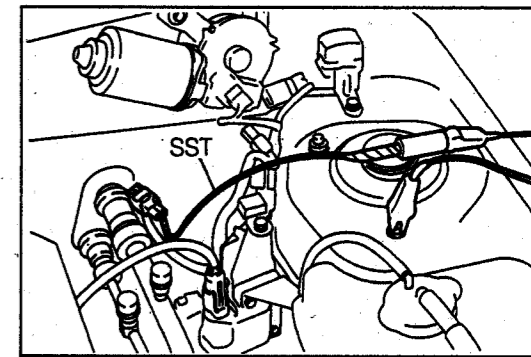
- ① Connect the following SST between ignition coil and vehicle side of ignition coil connector.
SST: 09991-87604-000

(If your tachometer is clamp on type this operation is unnecessary.)

CAUTION:

- Never allow the tachometer terminal to touch ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility with your unit before its use.

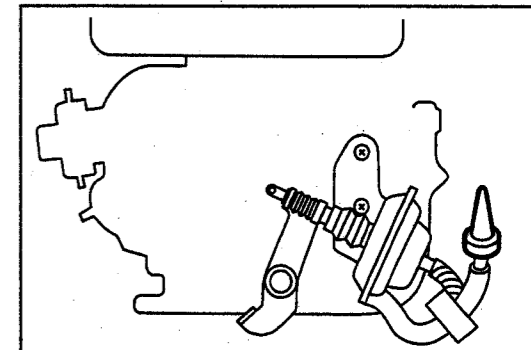
- ② Connect the tachometer to the engine, following by instruction of the manufacturer of tachometer.



G2MA00113-99999

- (2) Disconnect the vacuum hose from the dashpot.
- (3) Plug the disconnected hose, using the following SST.
SST: 09258-00030-000

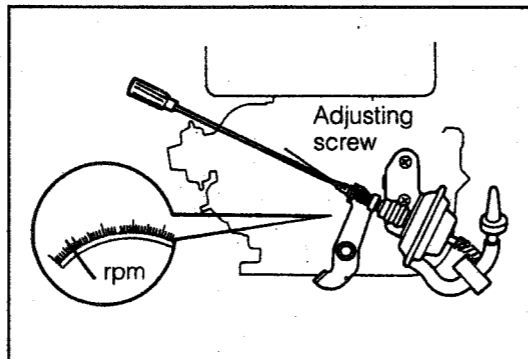
- (4) Ensure that the dashpot shaft is stretched fully.
- (5) Start the engine.



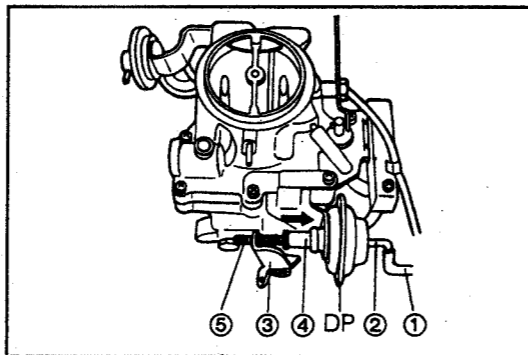
G2MA00114-99999

- (6) Check of touch revolution speed of throttle positioner
The touch revolution speed of the dashpot means the engine revolution speed at the time when the adjusting screw of the throttle lever makes contact with the dashpot shaft.

Touch Revolution: 1600 ± 50 rpm
 1300 ± 50 rpm
 (Australian specification)



G2MA00115-99999



G2MA00116-99999

If the touch revolution speed dose not conform to the specification, turn the adjusting screw so that the touch revolution speed may become the specified engine speed.

- (7) Remove the SST, which plug the vacuum hose.
 (8) Connect the vacuum hose to the dashpot.
 (9) Hold the engine revolution speed at 2500 rpm for five seconds.
 (10) Close the throttle valve quickly.
 (11) Measure the time required for the engine revolution speed to drop from 1800 rpm to 1200 rpm.

Specified Time: 0.5 - 5.0 seconds

- (12) If the time dose not conform to the specification, check/replace the following point.

- ① VTV for restriction or malfunction.
- ② Related vacuum hoses and vacuum pipe for restriction or damage.
 Replace the defective part, if any malfunction is existing.
 Replace the dashpot, if above point has no trouble.

(For details of dashpot replacement, refer to the FU section of the service manual.)

- (13) Remove the tachometer.
 (14) Remove the SST from ignition coil and vehicle side ignition coil connectors.
 (15) Reconnect the vehicle side ignition coil connector to the ignition coil.

G2MA00117-00000

10. Inspection and adjustment of CO/HC concentrations

Preparation to be made prior to check and adjustment of CO/HC concentrations.

- Apply the parking brake fully.
- Check and adjust the ignition timing.
- Check and adjust the idle speed.
- Warm up the engine thoroughly. (continue engine warm-up for another 10 minutes after the fan motor has started its operation.)
- All accessory switches are turned OFF.
- The air cleaner element is installed.
- All vacuum hose are connected.
- Ensure that the intake system exhibits no air leakage.
- Ensure that the exhaust system exhibits no air leakage.
- The shift lever is placed in the neutral position.
- The choke valve is open fully.

NOTE:

- Use the SST (09243-00020-000) to adjust the idle mixture adjusting screw.
- Be sure to prepare the CO/HC meter by following with the instruction of its manufacturer, before put into use.

G2MA00118-00000

CO adjustment (General specification)

- (1) Start and warm-up the engine.
- (2) Ensure that the engine revolution with in the specification.
 (See the check and adjustment of idle speed.)

G2MA00119-00000

- (3) Race the engine until its speed reaches 2000 rpm.
- (4) Measurement of CO concentration at the idle speed
 Check too see if the CO concentration conform to the specification.

Specified CO Concentration: 1.0 ± 0.5 %

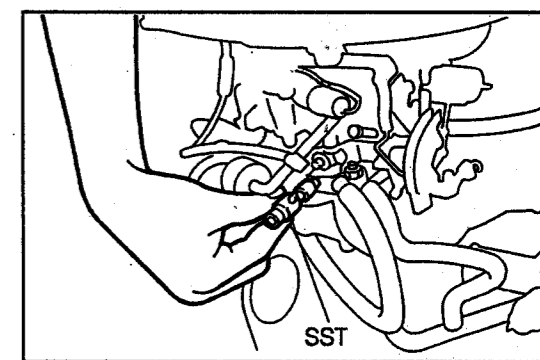
If the measured concentration fail to conform to the specification, perform the adjustments described in the step (5) onward.

- (5) Gradually turn the idle mixture adjusting screw, using the following SST, so that the CO concentration may conform to the specification.

SST: 09243-00020-000

NOTE:

- If the CO concentration is greatly deviated from the specification, set the mixture condition to initial setting. The initial setting can be achieved first by setting the idle mixture adjusting to the fully-closed position and then by backing off the screw four turns.

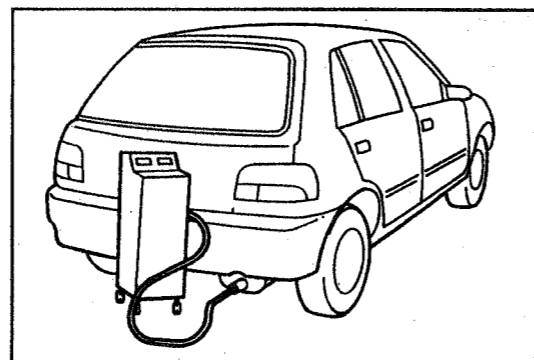


G2MA00120-99999

- (6) Turn the throttle adjusting screw so that the idle speed may become the specified speed.
Engine Idle Speed: 850 ± 50 rpm

- (7) Measurement of CO concentration
 Check to see if the CO concentration conform to the specification.
Specified CO Concentration: 1.0 ± 0.5 %

If the CO concentration fails to conform to the specification, perform the operation described in the step (3) onward.
 However, if the repeated adjustment will not get the conformity to the specification, carry out the trouble shooting in accordance with the table mentioned below.



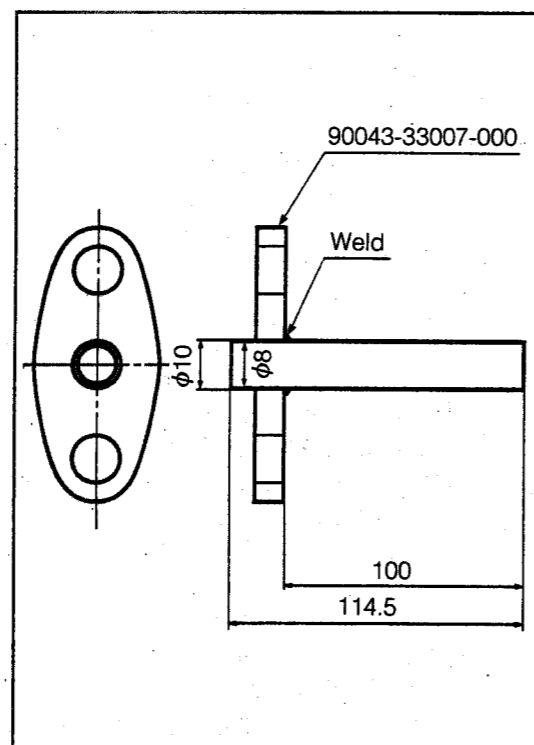
G2MA00121-99999

CO adjustment (European specification)

- (1) Start and warm-up the engine.
 (2) Ensure that the engine revolution with in the specification.
 (See the check and adjustment of idle speed.)

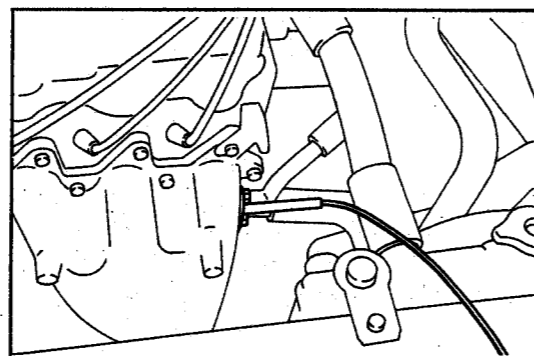
- (3) Stop the engine.
 (4) Remove the exhaust manifold cover.
 (5) Remove the plate from the exhaust manifold.
 (6) Install the inspection pipe to the exhaust manifold.

- NOTE:**
 • Fabricate the inspection pipe as showing the right figure.



G2MA00122-99999

- (7) Insert the sampling pipe into the inspection pipe.
 Plug the gap between the inspection pipe and the sampling pipe, using heat-resistant tape or the like.
 (8) Start the engine.



G2MA00123-99999

- (9) Race the engine until its speed reaches 2000 rpm.
 (10) Measurement of CO concentration at the idle speed
 Check to see if the CO concentration conform to the specification.
Specified CO Concentration: 1.0 ± 0.5 %

If the measured concentration fail to conform to the specification, perform the adjustments described in the step (11) onward.

- (11) Gradually turn the idle mixture adjusting screw, using the following SST, so that the CO concentration may conform to the specification.
SST: 09243-00020-000

NOTE:

- If the CO concentration is greatly deviated from the specification, set the mixture condition to initial setting. The initial setting can be achieved first by setting the idle mixture adjusting to the fully-closed position and then by backing off the screw four turns.

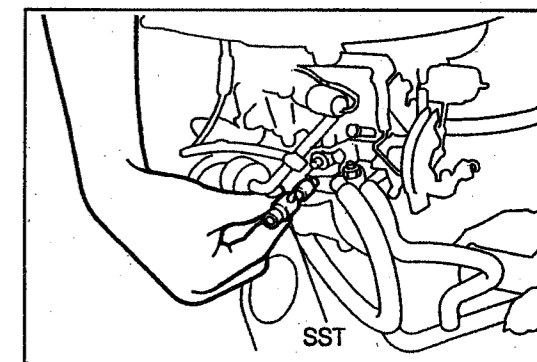
- (12) Turn the throttle adjusting screw so that the idle speed may become the specified speed.
Engine Idle Speed: 850 ± 50 rpm

- (13) Measurement of CO concentration
 Check to see if the CO concentration conform to the specification.
Specified CO Concentration: 1.0 ± 0.5 %

If the CO concentration fails to conform to the specification, perform the operation described in the step (3) onward.

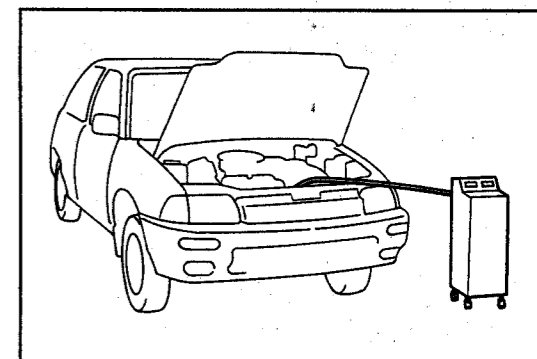
However, if the repeated adjustment will not get the conformity to the specification, carry out the trouble shooting in accordance with the table mentioned below.

- (14) Remove the inspection pipe.
 (15) Install the plate to the exhaust manifold with a new gasket.
 (16) Install the exhaust manifold cover.



G2MA00135-99999

G2MA00136-00000



G2MA00137-99999

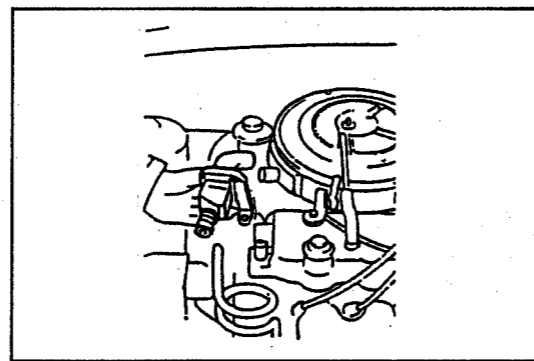
G2MA00138-00000

CO adjustment (Australian specifications)

- (1) Start and warm-up the engine.
- (2) Ensure that the engine revolution with in the specification.
(See the check and adjustment of idle speed.)

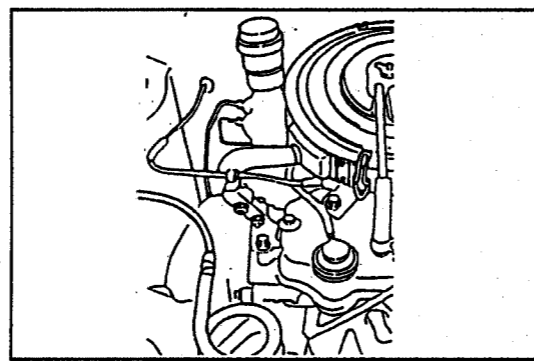
G2MA00139-00000

- (3) Remove the air suction valve.



G2MA00140-99999

- (4) Insert the sampling pipe into the air suction pipe. Plug the gap between the air suction pipe and the sampling pipe, using heat-resistant tape or the like.

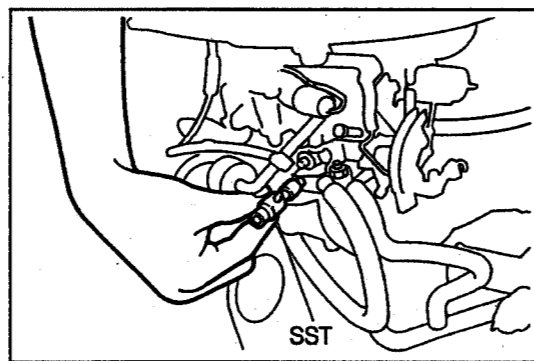


G2MA00141-99999

- (5) Race the engine until its speed reaches 2000 rpm.
- (6) Measurement of CO concentration at the idle speed
Check too see if the CO concentration conform to the specification.
Specified CO Concentration: 1.0 ± 0.5 %

If the measured concentration fail to conform to the specification, perform the adjustments described in the step (7) onward.

- (7) Gradually turn the idle mixture adjusting screw, using the following SST, so that the CO concentration may conform to the specification.
SST: 09243-00020-000



G2MA00142-99999

NOTE:

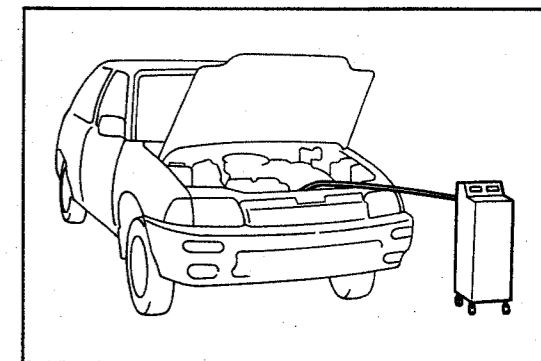
- If the CO concentration is greatly deviated from the specification, set the mixture condition to initial setting. The initial setting can be achieved first by setting the idle mixture adjusting to the fully-closed position and then by backing off the screw four turns.

- (8) Turn the throttle adjusting screw so that the idle speed may become the specified speed.
Engine Idle Speed: 850 ± 50 rpm

- (9) Measurement of CO concentration
Check to see if the CO concentration conform to the specification.
Specified CO Concentration: 1.0 ± 0.5 %

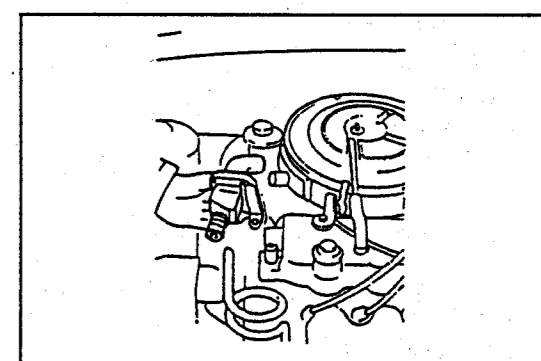
If the CO concentration fails to conform to the specification, perform the operation described in the step (3) onward.

However, if the repeated adjustment will not get the conformity to the specification, carry out the trouble shooting in accordance with the table mentioned below.



G2MA00143-99999

- (10) Reinstall the AS valve in the original position.

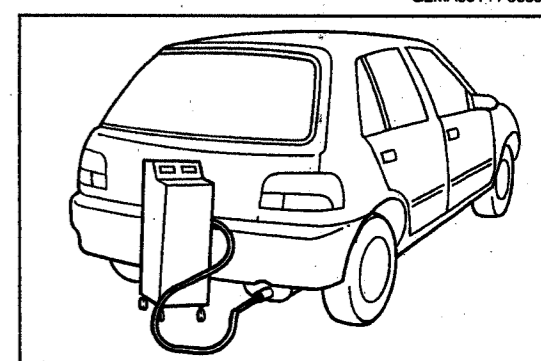


G2MA00144-99999

HC adjustment (General specification)

- (1) Start and warm-up the engine.
- (2) Ensure that the engine revolution with in the specification.
(See the check and adjustment of idle speed.)
- (3) Race the engine until its speed reaches 2000 rpm.
- (4) Measurement of HC concentration at the idle speed
Check too see if the HC concentration conform to the specification.
Specified HC Concentration: Not exceed 1000 PPM

If the measured concentration fail to conform to the specification, carry out the trouble shooting in accordance with the table mentioned below.



G2MA00145-99999

Possible Causes for Improper CO/HC Concentrations

Possible	Item	CO concentration	HC concentration	Remarks
Ignition timing			○	
Valve clearances			○	
Improper valve seating			○	Compression pressure
Ignition system problems Spark plugs Resistive cord Distributor Ignition coil		○	○	
Air leakage in intake system		○		
ITC valve malfunctioning		○		
Grate mechanical loss of engine inner parts		○		

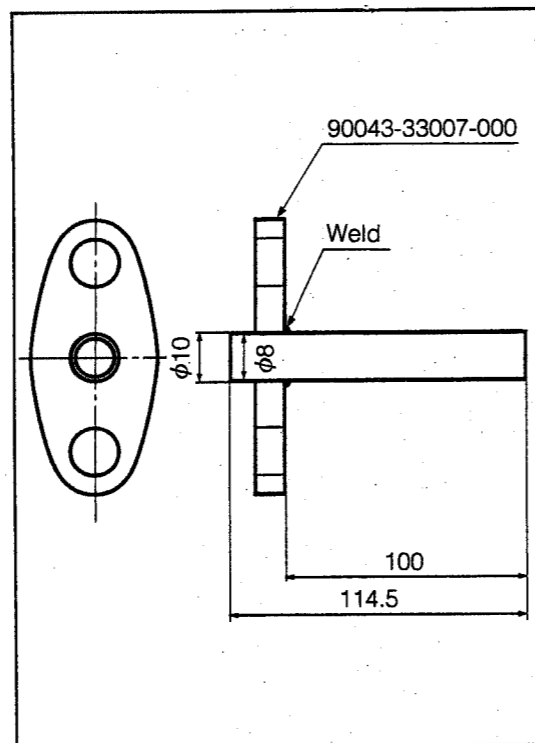
G2MA00146-00000

HC adjustment (European specification)

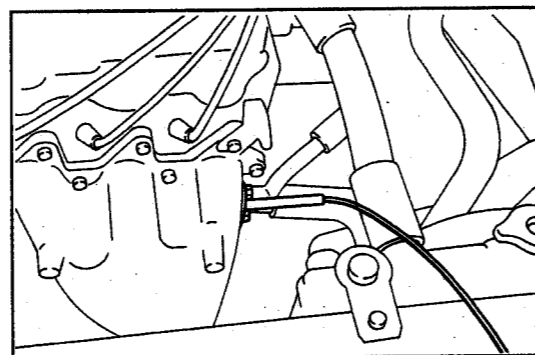
- Start and warm-up the engine.
- Ensure that the engine revolution with in the specification.
(See the check and adjustment of idle speed.)
- Stop the engine.
- Remove the exhaust manifold cover.
- Remove the plate from the exhaust manifold.
- Install the inspection pipe to the exhaust manifold.

NOTE:

- Fabricate the inspection pipe as showing the right figure.



G2MA00147-99999



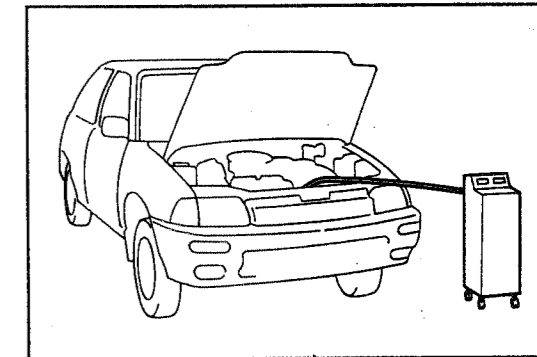
G2MA00147-99999

- Insert the sampling pipe to the inspection pipe. Plug the gap between the inspection pipe and the sampling pipe, using heat-resistant tape or the like.

- Race the engine until its speed reaches 2000 rpm.
- Measurement of HC concentration at the idle speed
Check too see if the HC concentration conform to the specification.

Specified HC Concentration: Not exceed 1000 PPM

If the measured concentration fail to conform to the specification, carry out the trouble shooting in accordance with the table mentioned below.



G2MA00149-99999

Possible Causes for Improper CO/HC Concentrations

Possible	Item	CO concentration	HC concentration	Remarks
Ignition timing			○	
Valve clearances			○	
Improper valve seating			○	Compression pressure
Ignition system problems Spark plugs Resistive cord Distributor Ignition coil		○	○	
Air leakage in intake system		○		
ITC valve malfunctioning		○		
Grate mechanical loss of engine inner parts		○		

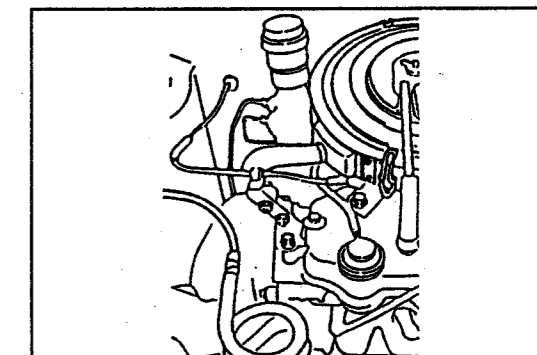
G2MA00150-00000

HC adjustment

- Start and warm-up the engine.
- Ensure that the engine revolution with in the specification.
(See the check and adjustment of idle speed.)
- Remove the air suction valve.

G2MA00151-00000

- Insert the sampling pipe into the air suction pipe. Plug the gap between the air suction pipe and the sampling pipe, using heat-resistant tape or the like.

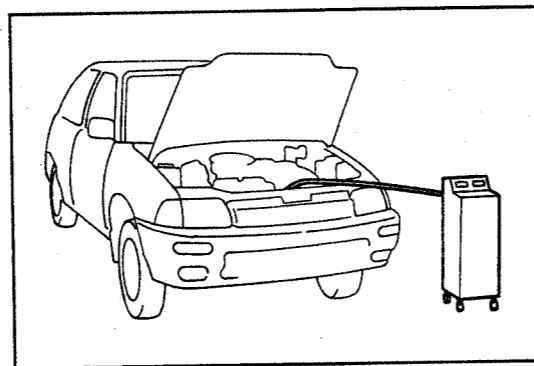


G2MA00152-99999

- (5) Race the engine until its speed reaches 2000 rpm.
- (6) Measurement of HC concentration at the idle speed
Check too see if the HC concentration conform to the specification.

Specified HC Concentration: Not exceed
1000 PPM

If the measured concentration fail to conform to the specification, carry out the trouble shooting in accordance with the table mentioned below.



G2MA00153-99999

Possible Causes for Improper CO/HC Concentrations

Possible	Item	CO concentration	HC concentration	Remarks
Ignition timing			○	
Valve clearances			○	
Improper valve seating			○	Compression pressure
Ignition system problems Spark plugs Resistive cord Distributor Ignition coil		○	○	
Air leakage in intake system		○		
ITC valve malfunctioning		○		
Grate mechanical loss of engine inner parts		○		

G2MA00154-00000

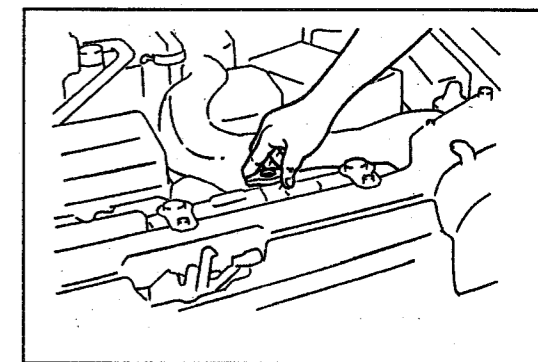
11. Change of coolant

WARNING:

- Never open the radiator cap when the engine is still hot.

CAUTION:

- As regards water to be used cooling water, use soft water which dose not contain salts of minerals, calcium, magnesium and so forth.
- If the coolant gets to the vehicle body, immediately flush away the coolant, using fresh water.

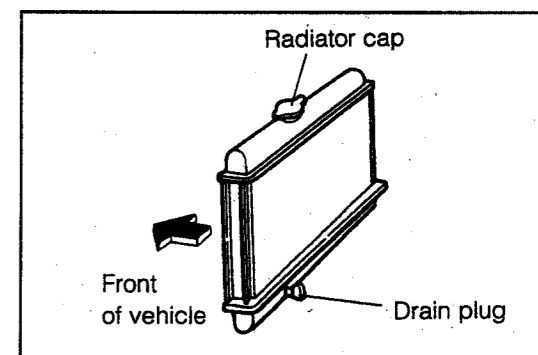


G2MA00124-99999

- (1) Ensure that the coolant temperature is nearly the ambient temperature.
- (2) Turn the radiator cap one step in an opening direction (counterclockwise direction) until you feel the first resistance.
- (3) Lightly press the radiator cap for two three times to release the inner pressure of the radiator.
- (4) Close the radiator cap.
- (5) Remove the two attaching bolts of the left side engine under cover.
- (6) Place an adequate container under the drain plug.
- (7) Drain the coolant by loosen the drain plug.
- (8) Remove the radiator cap.
- (9) Drain the coolant in the reserve tank.
- (10) Close the drain plug, after draining the coolant.
- (11) Fill the water to the radiator and reserve tank.
- (12) Start the engine.

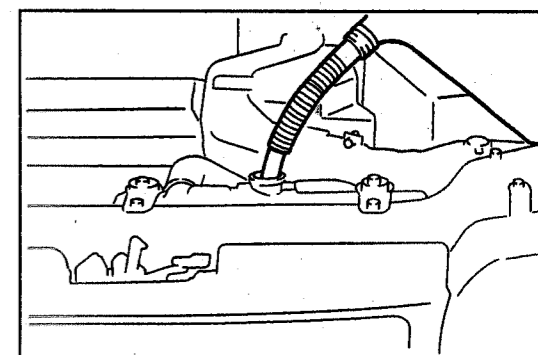
NOTE:

- If the water level in the radiator drops, replenish the water to full level.



G2MA00125-99999

- (13) Close the radiator cap.
- (14) Warm up the engine.
- (15) Stop the engine.
- (16) Cool down the water temperature to the ambient temperature.
- (17) Repeat the steps (1) through (16) two or three times.
- (18) Ensure that the coolant temperature is nearly the ambient temperature.
- (19) Turn the radiator cap one step in an opening direction (clockwise direction) until you feel the first resistance.
- (20) Lightly press the radiator cap for two three times to release the inner pressure of the radiator.
- (21) Close the radiator cap.
- (22) Place an adequate container under the drain plug.
- (23) Drain the water by loosen the drain plug.
- (24) Remove the radiator cap.
- (25) Drain the water in the reserve tank.
- (26) Replace the O-ring of the radiator drain plug with new one, after draining the water.
- (27) Install the radiator drain plug to the radiator securely.
- (28) Slowly pour a proper amount of antifreeze solution into the radiator in accordance with the instruction of the manufacturer of antifreeze solution.



G2MA00126-99999

CAUTION:

- Use a good brand of ethylene-glycol base antifreeze solution.

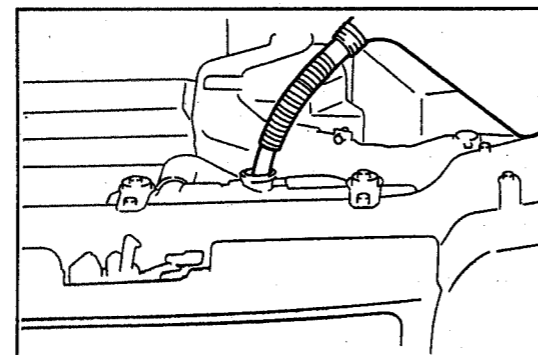
Coolant Capacity:

General specification	3.8 Liter
European specification	
Australian specification	

NOTE:

- The amount above includes 0.5 liter for the reserve tank.

G2MA00127-00000



G2MA00128-99999

- (29) Fill the water to the radiator and reserve tank.
- (30) Start the engine.

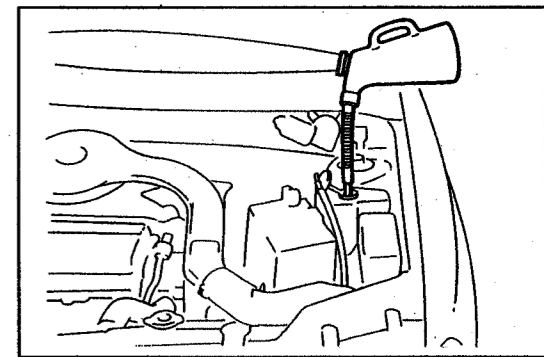
NOTE:

- If the water level in the radiator drops, replenish the water to full level.

- (31) Close the radiator cap.
- (32) Ensure that no water leakage is present. If water leakage is present, repair the water leakage.
- (33) Warm up the engine, until the radiator fan motor starts to rotate.
- (34) Stop the engine.
- (35) Cool down the coolant temperature to the ambient temperature.
- (36) Ensure that the coolant level in the reserve tank is not decrease.

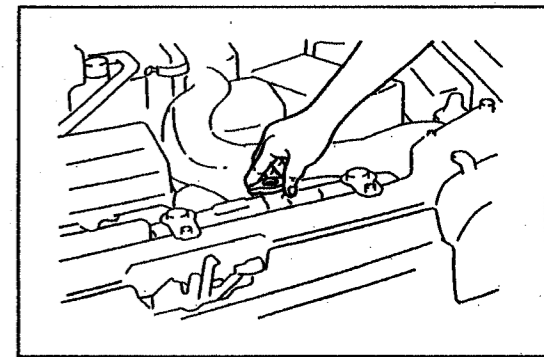
If the coolant level in the reserve tank is decreased excessively or no coolant remain in the reserve tank. Check the coolant level in the radiator whether coolant in the radiator is in full or not. If not replenish the water to the radiator, and repeat the steps (29) through (36) again.

- (37) Turn the radiator cap one step in an opening direction (clockwise direction) until you feel the first resistance.
- (38) Lightly press the radiator cap for two three times to release the inner pressure of the radiator.
- (39) Remove the radiator cap.
- (40) Ensure that the concentration of antifreeze solution in the radiator is meets to the instruction of the manufacturer of antifreeze solution by the densitometer. Adjust the concentration of the antifreeze solution in the radiator to the instruction of the manufacturer of antifreeze solution, if concentration dose not meets to the instruction of the manufacturer of antifreeze solution.



G2MA00129-99999

- (41) Secure the radiator cap.
- (42) Drain the water in the reserve tank.
- (43) Pour the coolant as mixed with antifreeze solution and water in accordance with the instruction of the manufacturer of antifreeze solution to the full level of the reserve tank.
- (44) Secure the reserve tank cap.
- (45) Install the left side engine under cover to the vehicle with two attaching bolts. Check the coolant in reserve tank.



G2MA00130-99999